

# Utah

## Natural Events Action Plan

State of Utah  
Department of Environmental Quality  
Division of Air Quality  
150 N. 1950 West  
P.O. Box 144820  
Salt Lake City, Utah 84114-4820  
801-536-4000  
<http://www.airquality.utah.gov/>

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## TABLE OF CONTENTS

Executive Summary .....	2
Introduction.....	3
Natural Events Policy .....	5
Natural Events Action Plan.....	8
Element 1: Documentation & Analysis .....	8
Element 2: Public Education Programs .....	9
Element 3: Public Notification Program and Health Advisory Program.....	11
Element 4: Determination and Implementation of BACM.....	12
BACM Determination.....	12
BACM Implementation .....	19
Current and Future Control Strategies .....	27
Current Studies.....	32
Element 5: Periodic Review.....	33
Appendix I .....	33
Appendix II (Additional Meteorological Data) .....	56
Appendix III (Supplemental Data from each Exceedance Event)	
Event 1: February 25, 2002	
Event 2: April 15, 2002	
Event 3: February 1, 2003	
Event 4: April 1&2, 2003	
Event 5: May 10, 2004	

# Natural Events Action Plan

## I. EXECUTIVE SUMMARY

During the last three years the Salt Lake Valley has experienced six exceedences of the 24-hour National Ambient Air Quality Standard (NAAQS) for Particulate Matter with a nominal aerodynamic diameter of 10 micron or less (PM10). Specifically on February 25, 2002, April 15<sup>th</sup> 2002, February 1<sup>st</sup> 2003, April 1st and 2<sup>nd</sup> 2003, and May 10<sup>th</sup> 2004, PM10 monitors along the Wasatch Front in northern Utah measured exceedences of the NAAQS. Analysis of each of these events pointed to the events having been caused by high wind speeds and resultant wind blown dust.

Due to the effect that uncontrollable natural events can have on air quality and NAAQS exceedences, the US Environmental Protection Agency (EPA) issued the National Events Policy (NEP) on May 30, 1996. The NEP lays out the procedures by which to develop a Natural Events Action Plan (NEAP). The purpose of a NEAP is to protect public health in areas where the NAAQS standard may be violated due to naturally occurring events such as high winds, wild fires, and seismic/volcanic activity.

The principles of the NEP policy are as follows:

1. Federal, State, and local air quality agencies must protect public health;
2. The public must be informed whenever air quality is unhealthy;
3. All valid ambient air quality data should be submitted to the EPA Aerometric Information Retrieval System (AIRS) and made available for public access;
4. Reasonable measures must be taken to safeguard public health regardless of the source of PM10 emissions; and,
5. Emission controls should be applied to sources that contribute to exceedences of the PM10 NAAQS when those controls will result in fewer violations of the standards.

In response to Salt Lake City's PM10 NAAQS exceedences, the Utah Division of Air Quality has developed the following NEAP for the Salt Lake City area.

The plan includes analysis and documentation of the exceedences that are attributable to uncontrollable natural events. Additionally, the NEAP provides a plan of action for the protection of public health during future natural PM10 events, including preemptive public education as well as public warnings during the events. Finally the plan contains current and future actions known as Best Available Control Measures (BACM) that are currently in place or that can be developed in the future to mitigate anthropogenic sources of PM10 during uncontrollable natural events.

## II. INTRODUCTION

Salt Lake City is the capitol of Utah and largest city in the State. The Salt Lake Metropolitan Area is located between the eastern and southern edges of the Great Salt Lake and the front range of the Wasatch Mountains in north-central Utah (see map on page 4). Approximately 1.5 million people live along the Wasatch Front in the metropolitan area that stretches from Ogden on the north to Provo on the south. Once you venture outside the immediate Salt Lake Valley, northern Utah is a mix of high elevation mountains and valley to the east and desert terrain to the west.

The climate throughout the year is similar to other arid high elevation valleys throughout the Intermountain West. The winters (Dec – Feb) are cold and feature enhanced precipitation while summer (June – Aug) conditions feature sustained high temperatures and arid conditions. Spring (Mar – May) and fall (Sept – Nov) tend to experience more storm systems moving through the area. These storms are often accompanied by strong surface frontal boundaries that usher strong surface winds into the area. Annual precipitation for Salt Lake City International Airport is approximately 6.5 inches. However, the last 6 years have been considered drought conditions throughout much of the Intermountain West, Utah included. The combination of this extended period of drought conditions combined with the natural occurrence of strong surface winds, particularly in the spring, has resulted in an increased likelihood for natural PM10 problems for the area. In the last three years, the Salt Lake area has recorded exceedences of the 24-hr average PM10 NAAQS during five events (six days – April 1 & 2 2003 is considered one event) during spring wind events. The PM10 concentrations from these events can be found in Table 1.

*Table 1. Natural PM10 Exceedences Found Within this Document*

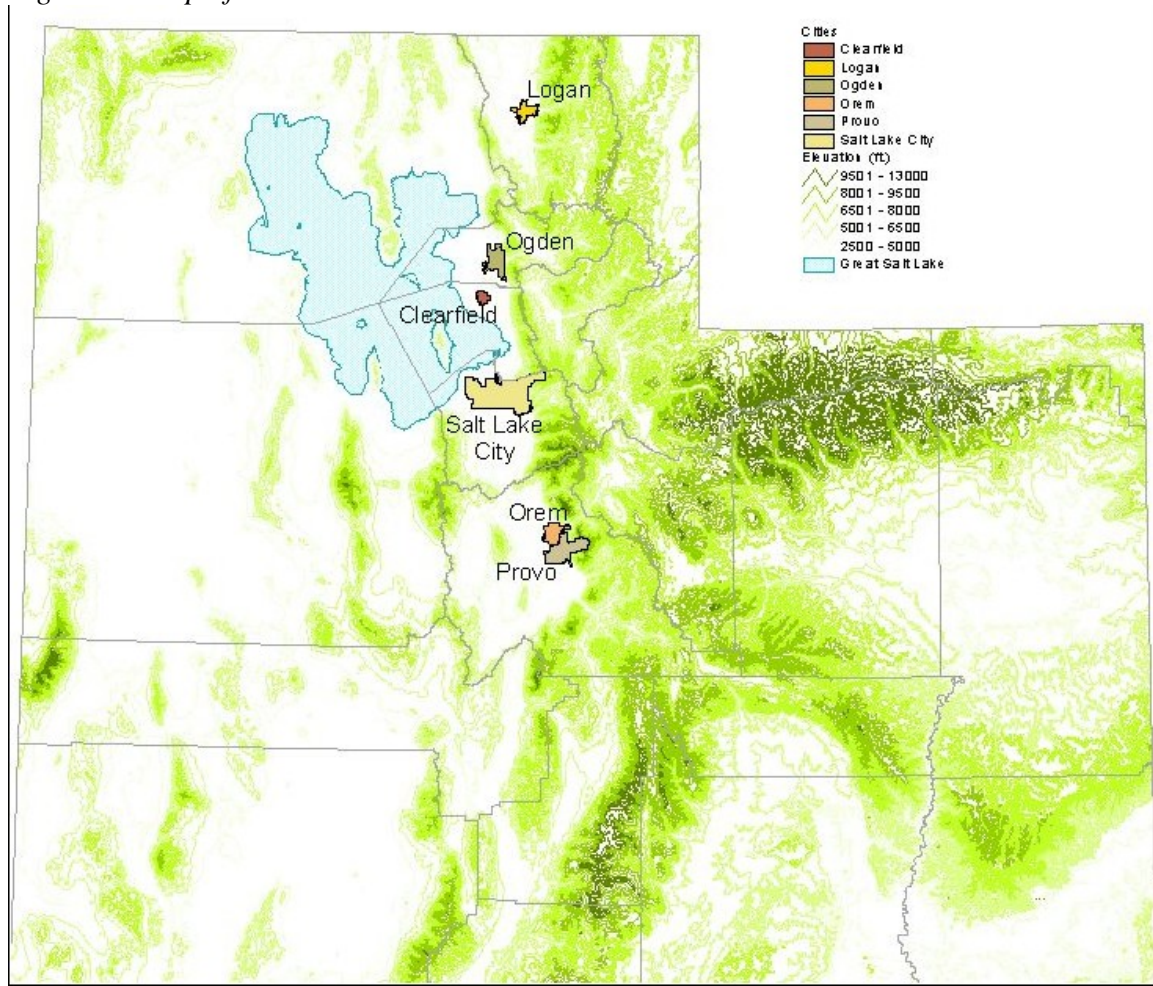
<b>Date</b>	<b>Monitor</b>	<b>PM10 Concentration (ug/m<sup>3</sup>)</b>
February 25,2002	Magna	253
April 15, 2002	Lindon	288
February 1, 2003	Hawthorne, North Salt Lake	162, 169
April 1, 2003	North Salt Lake, Hawthorne, Lindon, Magna, Ogden2	358,360,117,421,229
April 2, 2003	North Salt Lake, Hawthorne, Ogden2	209,120,119
May 10, 2004	North Salt Lake, Hawthorne, Lindon, Ogden2	189,129,159,136

The circumstances surrounding each of the PM10 exceedences within the Salt Lake metropolitan area have provided reason for the Division of Air Quality to believe that blowing dust associated with high wind events caused the NAAQS exceedences.

As required by the NEP, the Utah Air Monitoring Center (AMC) has flagged each of the exceedences in the AIRS system. The flags appear after the recorded values in AIRS with the descriptor code “A” for high winds. All supporting documentation of the high wind

events has been submitted to EPA Region VIII except for the May 10<sup>th</sup> 2004 event, the documentation for which is included in Appendix III of this document.

*Figure 1. Map of Northern Utah*



In accordance with EPA guidance, the type and amount of documentation provided for each event is sufficient to demonstrate that the natural event occurred, and that it impacted a particular monitoring site in such a way as to cause the PM<sub>10</sub> concentrations measured.

Recognizing the need to protect public health in areas where PM<sub>10</sub> concentrations exceed the NAAQS due to natural events such as the unusually high winds, a Natural Events Action Plan has been developed for the Salt Lake metropolitan area based on the NEP guidance. This plan outlines specific procedures to be taken in response to wind blown events. In short, the purpose of the plan is to:

1. educate the public about the problem;
2. mitigate health impacts on exposed populations during future events; and
3. identify and implement Best Available Control Measures (BACM) for anthropogenic sources of windblown dust.

### **III. The Natural Events Policy**

#### **1. Background**

In July 1986, the *Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events* and *Appendix K to 40 CFR, Part 50*, was issued by EPA to address situations where natural sources strongly influence an area's air quality. Appendix K provided, in part, that measured exceedences of the PM<sub>10</sub> NAAQS may be discounted from decisions regarding nonattainment area status if the data are shown to be influenced by uncontrollable events caused by natural sources of particulate matter.

In 1990, the Clean Air Act Amendments added section 188(f), providing EPA with discretionary statutory authority to waive either a specific attainment date or certain planning requirements for serious PM<sub>10</sub> nonattainment areas that are significantly impacted by non-anthropogenic sources.

On May 30, 1996, EPA issued the Natural Events Policy in a memorandum from Mary D. Nichols, Assistant Administrator for Air and Radiation. In this memorandum EPA announced its new policy for protecting public health when the PM<sub>10</sub> NAAQS are violated due to natural events. According to EPA's Natural Events Policy the section 188(f) waiver provision, Appendix K, and the Exceptional Events Guidance are to be considered revised by the requirements of the May 30, 1996 NEP. Under the NEP; three categories of natural events are identified as affecting the PM<sub>10</sub> NAAQS:

1. volcanic and seismic activity;
2. wildland fires; and,
3. high wind events.

Only high wind events will be addressed in this NEAP because no fire-based particulate matter events have occurred at this time. Based on EPA's natural events policy, high winds are defined as uncontrollable natural events if:

1. the dust originated from non-anthropogenic sources; or,
2. the dust originated from anthropogenic sources controlled with best available control measures (BACM).

#### **2. Content**

In order for exceedences of the NAAQS to be considered as due to a natural event, a Natural Events Action Plan must be developed to address future events. The following is a summary of the specific EPA guidance regarding development of a NEAP.

1. Analysis and documentation of the event should show a clear causal relationship between the measured exceedences and the natural event. The type and amount of documentation provided should be sufficient to demonstrate that the natural event

occurred, and that it impacted a particular monitoring site in such a way as to cause the PM10 concentrations measured.

2. Education programs should be established that are designed to educate the public about the short-term and long-term harmful effects that high concentrations of PM10 could have on their health and inform them that:
  - a. certain types of natural events affect the air quality of the area periodically,
  - b. a natural event is imminent, and
  - c. specific actions are being taken to minimize the health impacts of events.
3. Public exposure to high concentrations of PM10 should be minimized through a public notification and health advisory program. Programs to minimize public exposure should:
  - a. identify the people most at risk,
  - b. notify the at-risk population that a natural event is imminent or currently taking place,
  - c. suggest actions to be taken by the public to minimize their exposure to high concentrations of PM10, and
  - d. suggest precautions to take if exposure cannot be avoided.
4. Appropriate contributing controllable sources of PM10 should be abated or minimized. Programs to minimize PM10 emissions for high winds may include the application of BACM to any sources that have disturbed soil by anthropogenic activities. The BACM application criteria require analysis of the technological and economic feasibility of individual control measures on a case-by-case basis. The NEAP should include analyses of BACM for contributing sources.
5. If BACM is not defined, the State should identify, study, and implement practical mitigating measures as necessary. The NEAP may include commitments to conduct pilot tests of new emission reduction techniques. For example, it may be desirable to test the feasibility and effectiveness of new strategies for minimizing sources of windblown dust through pilot programs. The plan must include a timely schedule for conducting such studies and implementing measures that are technologically and economically feasible.
6. Periodically reevaluate<sup>1</sup>:
  - a. the conditions causing violations of a PM10 NAAQS in the area,
  - b. the status of implementation of the NEAP, and
  - c. the adequacy of the actions being implemented.

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<sup>1</sup> The State should reevaluate the NEAP for an area every 5 years at a minimum and make appropriate changes to the plan. This revision directly reflects element #6 as required under the Natural Events Policy.

7. The NEAP should be developed by the State in conjunction with the stakeholders affected by the plan.
8. The NEAP should be made available for public review and comment and may, but is not required, to be adopted as a revision to the State Implementation Plan (SIP) if current SIP rules are not revised.
9. The NEAP should be submitted to the EPA for review and comment.

The following text describes the Salt Lake NEAP and its conformance with the EPA guidance on natural events.



## **IV. Natural Events Action Plan**

### ***Element 1: Documentation and Analysis***

The State of Utah operates a network of air quality monitors that measure a variety of criteria pollutants including particulate matter. The monitors have been sited according to EPA sitting guidelines and many are located in population centers in order to capture the effect of criteria pollutants on the public. The remaining monitors are located in areas where pollutant levels are likely to be high.

In the State of Utah, the Division of Air Quality (DAQ) within the Department of Environmental Quality is responsible for monitoring whether exceedences of the National Ambient Air Quality Standards (NAAQS) occur. It is then the responsibility of the DAQ to determine whether a measured exceedence was the result of natural causes. If the exceedence is likely to have been the result of natural causes, the DAQ will apply a notation “flag” to the data contained in EPA’s Air Information Retrieval System (AIRS). The DAQ must then develop a document comprised of meteorological, air quality, and other data that demonstrates a causal relationship between the measured exceedence values and natural pollutant sources.

According to the Natural Events Policy (NEP), “the conditions that create high wind events vary from area to area with soil type, precipitation and the speed of wind gusts.” Thus, states are to determine the conditions that define high wind events in an area. The process of determining what wind speeds define a high wind event in Utah is an extended process, involving the collection and analysis of a significant amount of meteorological and air quality data. Since this process will be lengthy, while the specific wind speeds for high wind events are being developed, the State of Utah will use the definition of high winds found in the *Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events*. The guidelines define high winds as: “An hourly wind speed of greater or equal to 30 mph or gusts equal to or greater than 40 mph, with no precipitation or only a trace of precipitation.”

In the past three years, the State of Utah has experienced six days in which the NAAQS for PM10 was exceeded. In each case, the definition of high winds was met and a document summarizing the event and providing meteorological, air quality, and other pertinent data was submitted to the EPA for review. In the case of May 10<sup>th</sup> 2004, the documentation package is being submitted in Appendix III of this document. Table 2 indicates the dates of these events and the resultant PM10 values. The additional documentation about each of these exceedences can be found in the appendices of this document.

*Table 2. Natural PM10 Exceedences Found Within this Document*

<b>Date</b>	<b>Monitor</b>	<b>PM10 (ug/m<sup>3</sup>) Concentration</b>
February 25,2002	Magna	253
April 15, 2002	Lindon	288
February 1, 2003	Hawthorne, North Salt Lake	162, 169
April 1, 2003	North Salt Lake, Hawthorne, Lindon, Magna, Ogden2	358,360,117,421,229
April 2, 2003	North Salt Lake, Hawthorne, Ogden2	209,120,119
May 10, 2004	North Salt Lake, Hawthorne, Lindon, Ogden2	189,129,159,136

## ***Element 2: Public Education Programs***

The purpose of Public Education Programs are to inform and educate the public about the effect of increased criteria pollutant values due to natural sources, most notably the potential health effects. The Public Education Programs are meant to be pre-emptive and should be enacted in an ongoing fashion before and after natural PM10 events.

In order to protect public health the State has developed a series of education and outreach programs as well as interactive information sources that enable the public to understand the risk posed by each of the criteria pollutants found within the NAAQS.

The programs that the State has already developed to deal with natural wind events and the potentially hazardous effects of fugitive dust PM10 are as follows:

1. DAQ provides current PM10 air quality levels and information about the impact of fugitive dust PM10 on health including information on who is particularly sensitive to PM10. This information is transmitted to the public via a real-time website (<http://atlas.utah.gov/website/amccurrent>)
2. DAQ provides information to the public through traditional news outlets including local newspapers, television and radio, enabling stories that inform the public about the potential health and safety impacts of fugitive dust PM10.
3. During severe air quality events DAQ spokespersons routinely speak directly with local media outlets (radio, television, newspapers) to ensure that the public understands the severity and repercussions of naturally occurring fugitive dust events. In addition, DAQ spokespersons use the opportunity of the fugitive dust event to educate the public about how natural events occur and how the public can protect themselves during future events.
4. DAQ informs the public about the long and short-term effects of air pollution on their health through a dedicated website ( <http://www.cleanair.utah.gov> ).
5. DAQ works with area schools to advise them about current air quality conditions as well as the detrimental impacts of poor air quality. The schools will keep

children inside during air quality episodes based on Air Quality Index (AQI) forecasts.

6. DAQ works with the local American Lung Association to provide information to groups that are sensitive to poor air quality conditions.
7. DAQ developed a brochure that included the impacts and causes of air pollution, as well as steps that the public could take to minimize their exposure.

In addition to the current efforts to inform the public, in order to further safeguard the public, the DAQ will consider the development of additional public notification and education programs. The goals of the future programs would be to:

1. explain the effect that natural pollution events have on their communities,
2. explain that these natural events are eminent, and
3. explain the actions that are being taken to minimize the effects of natural events.

In order to fulfill these goals, DAQ will continue to refine programs with local business, non-profit organizations, health care professionals, media, and educational organizations to provide further information to the public. Programs that already exist and will be considered for further development are listed below:

**Community Outreach:**

- Community Center Events
- Pollution Advisories
- Smoking Vehicle Hotline (SMOG) (801)-944-7664
- Additional online pollution education (<http://atlas.utah.gov/website/amccurrent> )
- Advertising/PSA
- Working with local businesses

**School and Youth Outreach:**

- Classroom Presentations
- Teacher Training
- Air Quality Curricula

**Annual Public Events:**

- Earth Day Events

### ***Element 3: Minimize Public Exposure***

To minimize the exposure of high concentrations of atmospheric pollutants, the NEP requires that the public be given notice when a natural pollution event is imminent, is currently taking place, or is likely to occur. Currently, prior to naturally occurring high wind events, the Utah Air Monitoring Center (AMC) distributes a high wind advisory via a fax distribution list and recorded message on a call-in line. In addition, DAQ is actively involved in EPA's AQI and AIRNow programs. Through these systems, DAQ provides daily air quality data and forecasts to the public through a number of EPA and DAQ websites. Real-time air quality data and air-quality forecasts can also be found in the following locations:

<http://www.airquality.utah.gov/Odometer.htm>  
<http://www.airmonitoring.utah.gov/f-current.htm>  
<http://www.epa.gov/airnow>  
<http://atlas.utah.gov/website/amccurrent>  
<http://www.airmonitoring.utah.gov/utahmap.htm>

In addition to online information, Utah DAQ has developed the following other procedures in order to minimize public exposure:

1. DAQ works with the local American Lung Association to provide targeted information to groups that are sensitive to poor air quality conditions.
2. DAQ provides information to the public through traditional news outlets including local newspapers, television and radio, enabling stories that inform the public about the potential health and safety impacts of fugitive dust PM10.
3. DAQ provides daily air quality forecasts and data to local school districts so that the schools can reduce the exposure to children by limiting outdoor time.
4. DAQ has developed a listserv that is available on its website that allows interested people to submit their email addresses to us. This system then emails notices to the submitted email addresses whenever air quality levels along the Wasatch Front are approaching unhealthy levels.

In the future, in an effort to bolster Utah's public notification and exposure minimization system, DAQ will analyze the current public notification system and consider enhancements to it.

The focus of DAQ's review of the current system will be based on the following goals:

1. development of a better explanation of how natural pollution events occur,
2. development of better identification methods for groups sensitive to fugitive dust,
3. development of a better explanation of the impact of pollutants on health, in particular how pollutants impact sensitive groups, and

4. development of more robust precautionary measures that can be taken by the public.

The goals of this campaign to minimize public exposure to unhealthy PM10 levels may take the form of the following:

1. Continuing to work with local groups such as local hospitals and the local American Lung Association to identify sections of the population who are particularly sensitive to increased pollution concentrations and provide these groups additional information during PM10 fugitive dust events.
2. Developing a system to better identify and notify “at risk” individuals about current or upcoming natural pollution event that may negatively impact their health, by using a recorded message or expanding our listserv.
3. Continuing to work with the Salt Lake office of the National Weather Service to assess the likelihood of these events in their weather discussions and to provide warnings to the public of forecast dust events.
4. Expanding the public notification process for upcoming or current natural pollution events using:
  - a. public and private schools through the regional school districts,
  - b. media outlets,
  - c. the National Weather Service, and
  - d. local organizations.
5. Identifying further actions that will help eliminate or reduce exposure.

#### ***Element 4: Determination and Implementation of Best Available Control Measures***

##### **1. BACM Determination**

According to the NEP, BACM must be implemented for anthropogenic sources contributing to NAAQS exceedences in moderate PM10 nonattainment areas. BACM for PM10 are defined in 59 F.R. 42010, August 16, 1994 as techniques that achieve the maximum degree of emissions reduction from a source as determined on a case-by-case basis considering technological and economic feasibility.

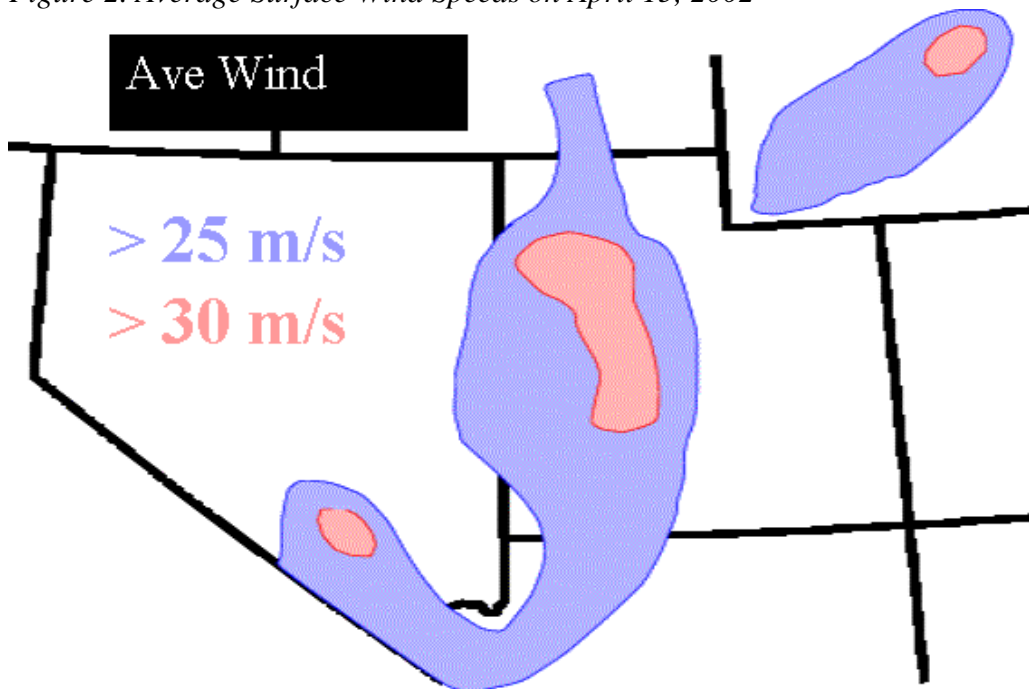
To determine which control measures would best alleviate the natural PM10 exceedences, the DAQ analyzed each of the five PM10 events (April 1 & 2, 2003 are considered one event) that occurred during the previous 3 years. Based on analyses of the five exceedence events referred to earlier in this document, criteria were developed which tended to lead to high natural PM10 concentrations. These criteria are as follows:

1. High concentrations of PM<sub>10</sub> were caused by a mixture of anthropogenic and non-anthropogenic sources coming from outside the non-attainment area as a result of strong winds and entrained dust from the west-northwest of the non-attainment area. The entrained dust was typically the result of a surface cold front that moved into the area and transported suspended dust from west-northwest over the Salt Lake City region.
2. Spring storm systems were more likely to produce entrained crustal PM<sub>10</sub> because of the timing of the storms between the time that the snow pack melted, releasing trapped dust, and the time when green-up and re-vegetation occurred which suppressed fugitive dust.
3. Prolonged climatic conditions of low precipitation over an extended period of time that acted to dry area soils and made them more susceptible to wind erosion.

Once the preceding conclusions were drawn about the natural causes of PM<sub>10</sub> events in the Salt Lake Area, each of the PM<sub>10</sub> events from the preceding three years were analyzed to determine whether local anthropogenic or non-anthropogenic sources were likely contributors to the PM<sub>10</sub> exceedences.

During the April 15, 2002 event, strong southerly winds blew throughout Utah with 25m/s (56 mph) winds throughout most of the state as can be seen in Figure 2.

*Figure 2. Average Surface Wind Speeds on April 15, 2002*



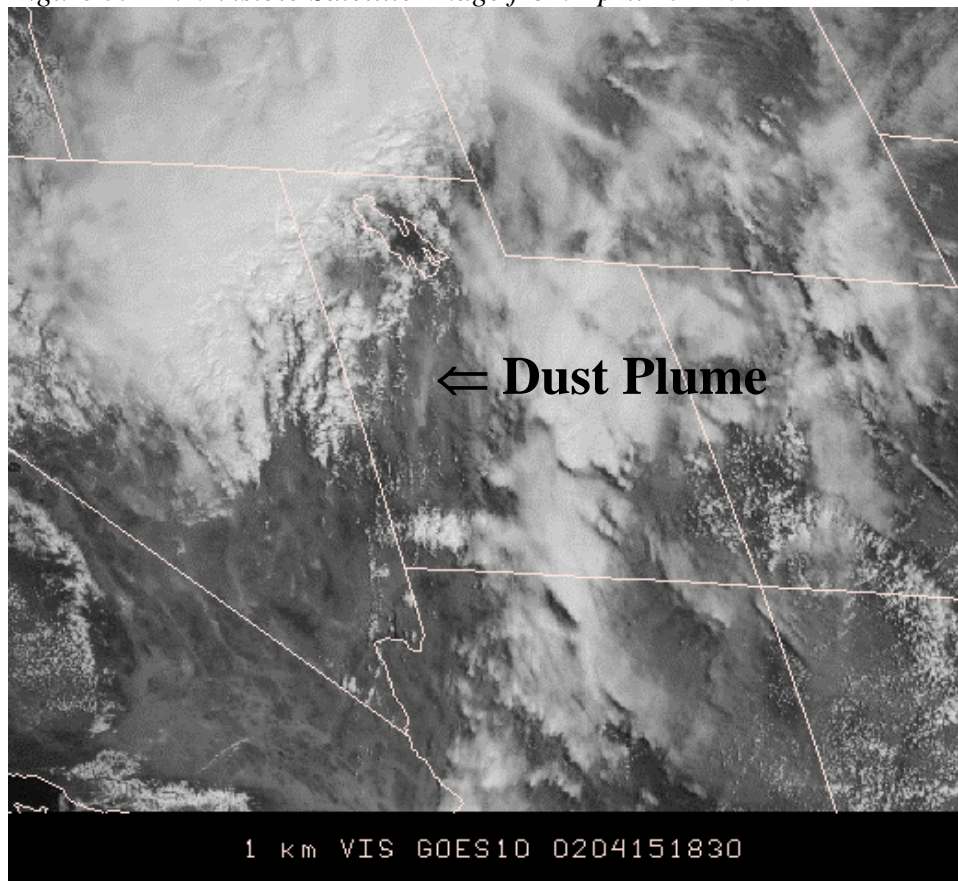
These winds were responsible for transporting significant amounts of particulate crustal material into the Wasatch Front region. Evidence of this transport is seen in the Visible Satellite image from 1830Z on April 15<sup>th</sup> 2002(Figure 3), a plume of dust can be seen

starting at the Sevier Dry Lake bed in southwestern Utah and being transported all the way into the Salt Lake area.

Although this event was apparently caused by natural regional crustal material becoming suspended in the air and transported into the Salt Lake area from the arid portions of south-central Utah by extremely strong southerly winds, an analysis was performed to determine whether local anthropogenic or non-anthropogenic sources may have contributed to the exceedance value at the Lindon Monitoring site. A map of the local sources within 1 mile and 10 kilometers circles of the Lindon monitor can be seen in Figure 4 (on page 15). Based on the predominate southerly wind direction during the event, sources between 130 and 220 degrees were analyzed for potential impact.

During the February 25, 2002, February 1, 2003, April 1 & 2, 2003 and May 10, 2004 events, the data seems to suggest a different cause for the high PM10 concentrations. In each of these events a strong surface low-pressure system and well-defined surface cold front was moving into the Salt Lake City area. Additionally, in each of these events the maximum concentrations occurred during the hours PM10 coincident with the cold frontal passage. As a result, the high concentrations were recorded during westerly flow in each of the events. An example of this from the May 10<sup>th</sup> 2004 event can be seen in the attached surface trajectories (Figure 5 and 6 on page 16).

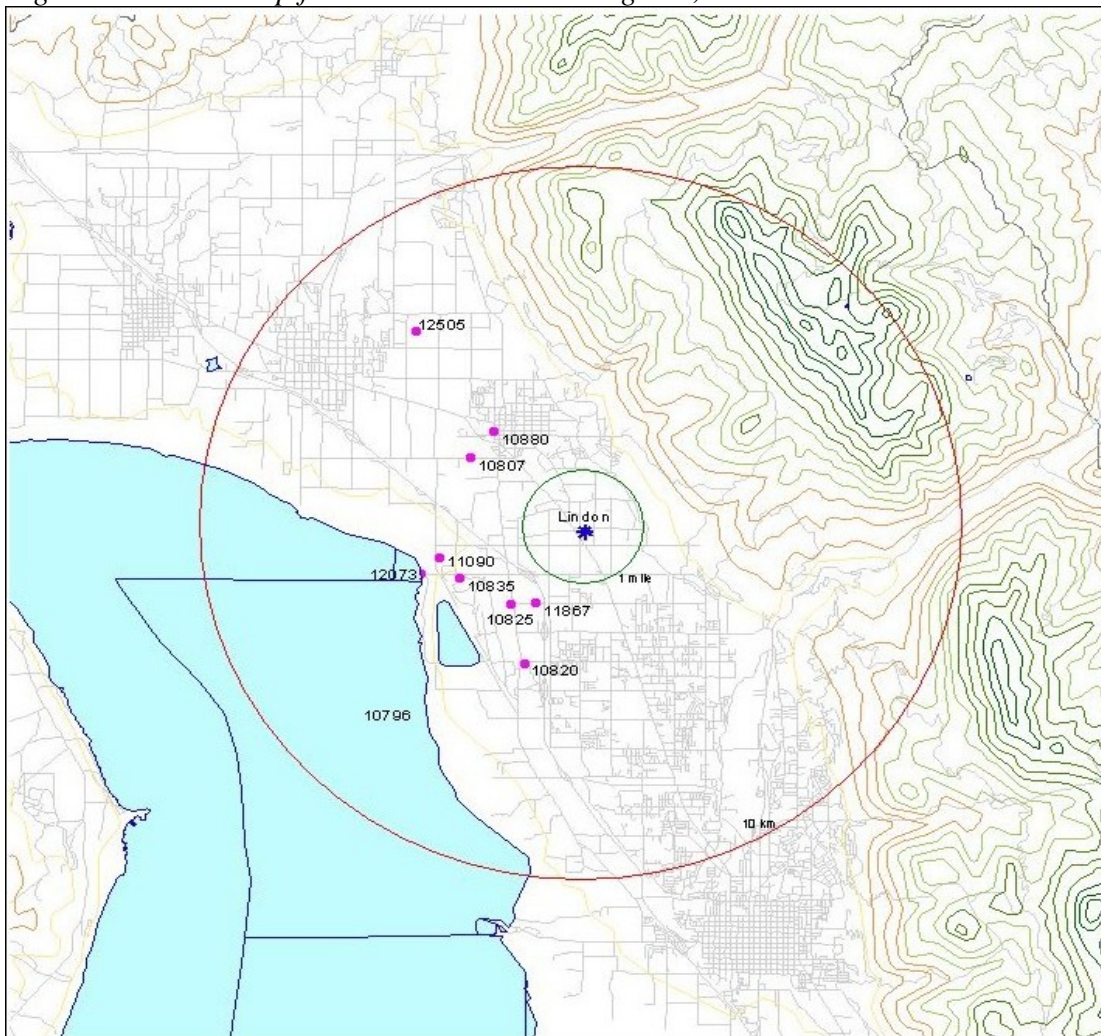
*Figure 3. 1 km Visible Satellite Image from April 15<sup>th</sup> 2002*





The trajectories indicate the path air parcels traveled before (Figure 5) and after the passage of the cold front (Figure 6). Figure 4 depicts the parcel path that coincided with the highest measured PM10 concentration. Therefore, it stands to reason that the trajectory would indicate the direction in which the majority of the fugitive PM10 was being entrained. The trajectory (Figure 6) shows air flowing from south to north across the desert regions south of I-80 then flowing east into the north end of the Salt Lake Valley. The information from the February 25, 2002, May 10, 2004, April 1&2, 2003, and February 1, 2003 events consistently suggests that a similar post frontal trajectory produces elevated PM10 concentrations, suggesting that the high PM10 levels that were recorded in the Salt Lake area were the result of dust that was entrained by the high winds and gusts in the arid northwestern portion of Utah and was then transported within

*Figure 4. Source map for the Lindon Monitoring Site, with 1 mile and 10km circles*

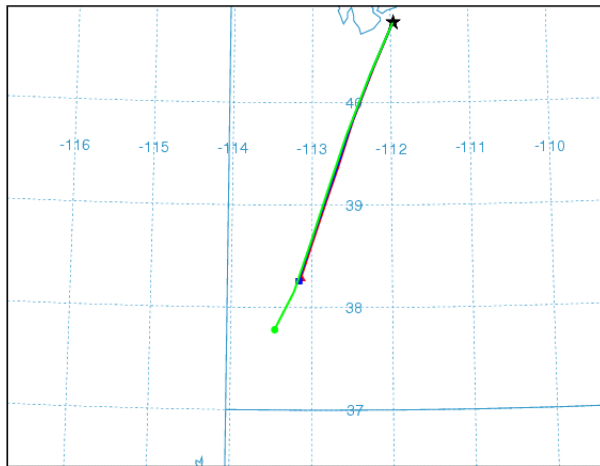


the turbulent air mass near the cold front into the Salt Lake area. Although trajectories of each of these events hint at the reason for northwesterly winds causing higher PM10 concentrations, the process by which PM10 is transported into the Salt Lake area is actually a result of the suspension of particulate material that occurs in the turbulent frontal zone. Then as the frontal zone moves eastward, so to do the high concentrations of PM10. This can be a confusing result, as prefrontal southerly winds do increase PM10

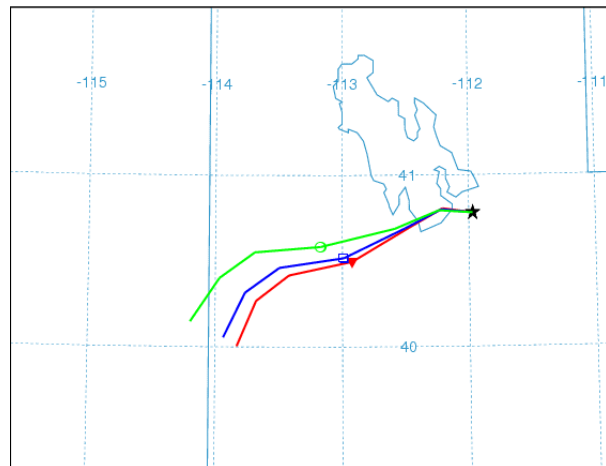


levels somewhat. However, in each of the events in the NEAP (with the exception of April 15, 2002 which featured extremely strong southerly winds) the highest PM<sub>10</sub> levels occurred when the cold frontal zone was near the recording monitor suggesting that the PM<sub>10</sub> causing the exceedences is actually the crustal material that has been entrained by the eastward-moving frontal boundary.

*Figure 5. Prefrontal Parcel Trajectory*

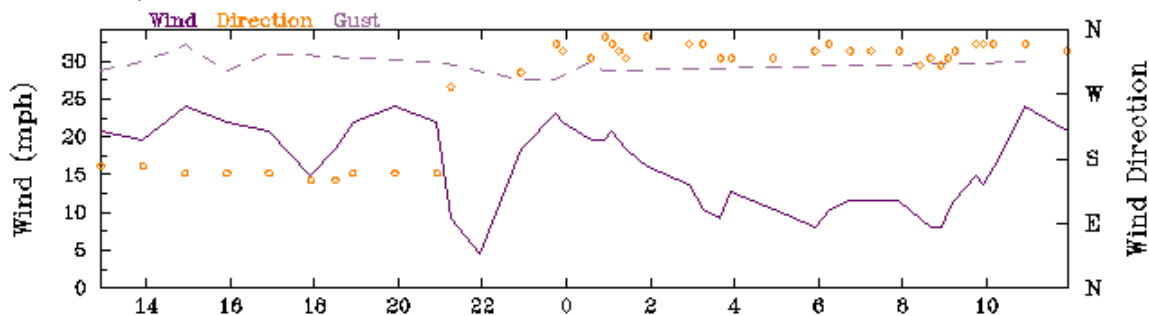


*Figure 6. Postfrontal Parcel Trajectory*



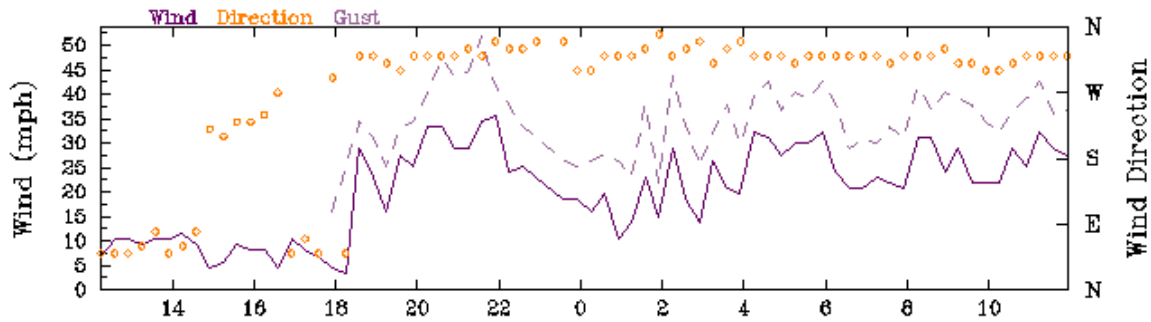
Additional support for the theory that natural dust events in the Salt Lake Valley are a result of entrained dust from the arid region west-northwest of the valley came in the analysis of the February 1<sup>st</sup>, 2003 event. During this event, winds in the western valleys sustained speeds greater than 30 mph with gusts as high as 55 mph. A graph of winds from Wendover, NV is seen below (Figure 7). Wendover, NV is just across the UT-NV border and the monitoring site at Wendover, NV is representative of the conditions in Utah's western deserts.

*Figure 7. Wind Speed and Direction from 12z on May 10<sup>th</sup> through 12z on May 11<sup>th</sup> for Wendover, NV*



During this event the winds in the Salt Lake Valley were lower than those experienced in the west desert valleys. Winds at Salt Lake International Airport can be seen in Figure 8 with winds averaging 17mph.

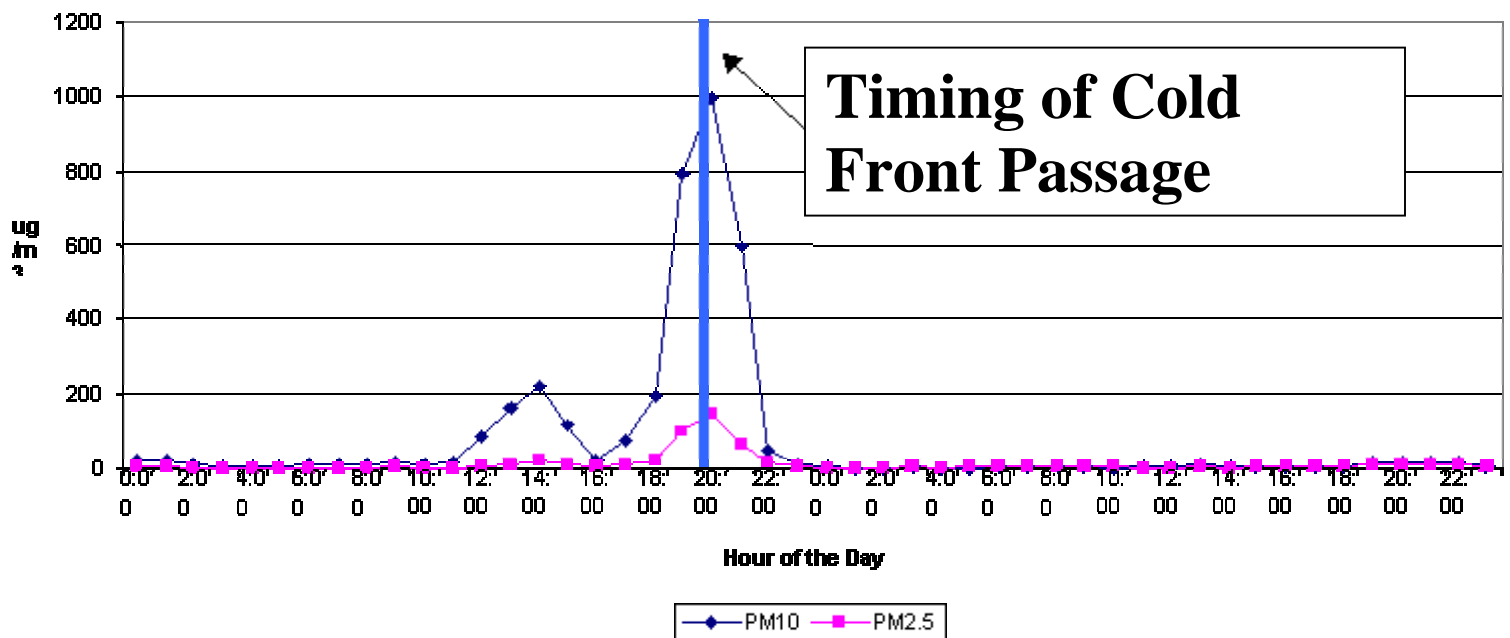
Figure 8. Wind Speed and Direction from 12z on May 10<sup>th</sup> through 12z on May 11<sup>th</sup> for Salt Lake City, UT



The difference in wind speeds between Salt Lake and the west desert caused the Salt Lake Valley to once again become a deposition zone for entrained PM10 from west of the valley. Additionally, in this event, precipitation trailed the cold front, allowing the high winds to produce the dust event first. Figure 9 shows the hourly PM10 and PM2.5 TEOM values registered by the exposed instrument at the Hawthorne monitor February 1 & 2, 2003. Note the very high values coinciding with the passage of the dry front and the introduction of the air mass from west of the valley.

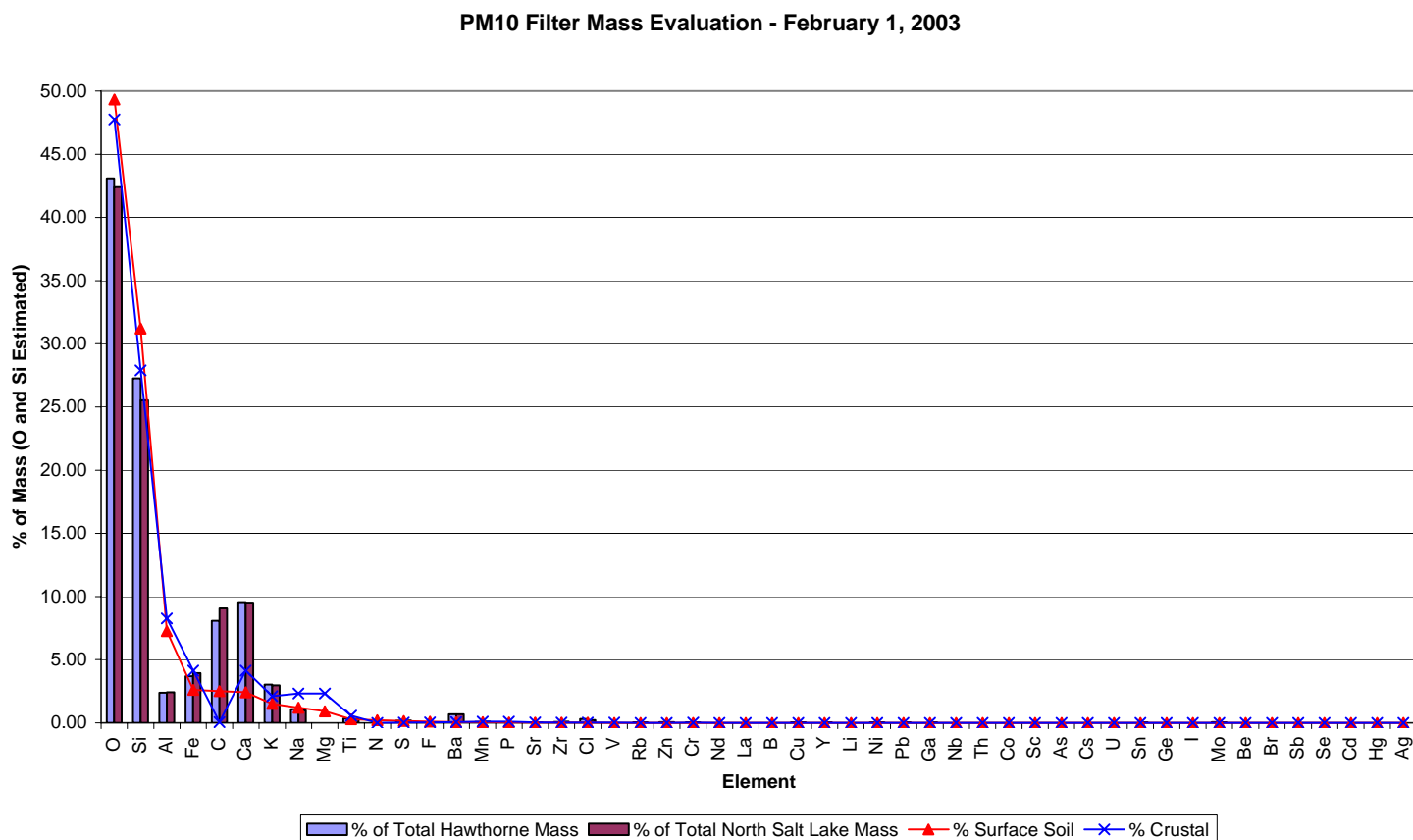
Figure 9. Hourly PM10 and PM2.5 TEOM data for the Hawthorne Monitor Located in Salt Lake City, UT from February 1<sup>st</sup> to 2nd, 2003

February 1 & 2, 2003 - Hourly TEOM PM10 & PM2.5 - Hawthorne Monitor



In addition, a combined X-ray fluorescence protocol 4, Ion Chromatography, and organic/elemental carbon analysis of the FRM filters indicated that a high percentage of the mass of the material collected on the February 1, 2003, exposed filters at the Hawthorne and North Salt Lake monitors, was skewed toward the crustal elements and had very low levels of sulfates and nitrates, which is indicative of wind blown dust. Also, the valleys west of the Salt Lake Valley contain soils that are rich in minerals that contain calcium. The high peak in the Ca illustrated in Figure 10 is indicative of crustal material from the valleys west of Salt Lake, providing further evidence for the high PM10 levels within the Salt Lake Valley having been caused by fugitive dust from the arid valleys in northwestern Utah.

*Figure 10. Filter Speciation for the Hawthorne and North Salt Lake Monitoring Sites from February 1<sup>st</sup>, 2003*



The evidence for crustal material having been transported into the Salt Lake Valley from natural sources west and northwest of the Salt Lake Area is also supported by the data from the April 1<sup>st</sup> and 2<sup>nd</sup> 2003 and May 10<sup>th</sup> 2004 events and can be seen in Appendices II, III, and IV of this document.

In the February 25<sup>th</sup> 2002, February 1<sup>st</sup> 2003, April 1<sup>st</sup> and 2<sup>nd</sup> 2003, and May 10<sup>th</sup> 2004 events, despite strong prefrontal southerly winds, PM10 levels did not rise dramatically

until the surface cold frontal zone moved into the area of the monitoring sites, introducing suspended crustal material from sources located west-northwest of the Salt Lake area. In addition to possible anthropogenic sources that will be discussed later, the westerly/northwesterly flow direction has become an increasingly probable source over the past few years due to drought conditions and the recession of the Great Salt Lake. As a result of this lake recession, increased beach area has developed, providing a rich source of crustal PM10. The attached satellite images show the increase in beach area around the Great Salt Lake from 1998 (Figure 11) to 2002 (Figure 12). From 1998 to 2002 the reduced lake levels uncovered approximately 1000 square miles of new beach area.

Although beach area increased around the entire Great Salt Lake, the southern and southwestern portions of the lake have had particularly large increases in beach area. The attached satellite images show beach area increasing to such an extent that a land bridge developed on the south end of the lake between North Salt Lake and Antelope Island. This beach growth along the southern end of the lake is particularly influential given the westerly flow that predominated during the other PM10 events. In order to address the increasing role that the beach area around the Great Salt Lake is playing in natural PM10 events the DAQ is in the process of studying the crustal material found on the new beach area. More information on this study is found in the following section on BACM implementation.

As with the analysis of the Lindon Site during the April 15<sup>th</sup> 2002 event, once the directional nature of the PM10 fugitive dust impact was determined for the February 25<sup>th</sup>, February 1<sup>st</sup>, April 1<sup>st</sup> and 2<sup>nd</sup>, and May 10<sup>th</sup> events in the Salt Lake Valley, possible anthropogenic sources of PM10 were mapped and analyzed based on their potential impact on each of the monitor locations. The maps (Figures 13, 14, and 15) indicate the potential PM10 point sources within circles of 1 mile and 10 km of each monitor. Given the directional nature of the PM10 effect, only sources southwest through north (220-360 degrees) of the Salt Lake City monitors were considered for BACM. The southwesterly direction was included in order to be certain that no sources that were entraining dust from the southwest just prior to frontal passage would be left out of the BACM discussions.

## **2. BACM Implementation**

### **Source Maps and Local Anthropogenic Sources**

- I. *Lindon (Figure 4)*
- II. *Hawthorne (Figure 13)*
- III. *North Salt Lake (Figure 14)*
- IV. *Ogden2 (Figure 15)*
- V. *Magna (Figure 16)*

Each map (Figures 4, 13, 14, 15, and 16) listed above depicts all PM10 emission inventory sources that reside within 1 mile and 10 km circles of each monitor. The sources plotted on the maps include all permitted sources that produce fugitive dust emissions greater than ### tons per year and represent all significant fugitive dust sources

within the Salt Lake area. Additionally, the directions of impact (the predominate wind direction that occurred during each of the natural high wind events) are drawn on the maps.

In order to determine which PM10 sources had the greatest potential anthropogenic impact during naturally occurring high wind events, each of the maps were used to find the sources that reside within the direction of impact. All the sources that were within the direction of impact were tabulated for further analysis.

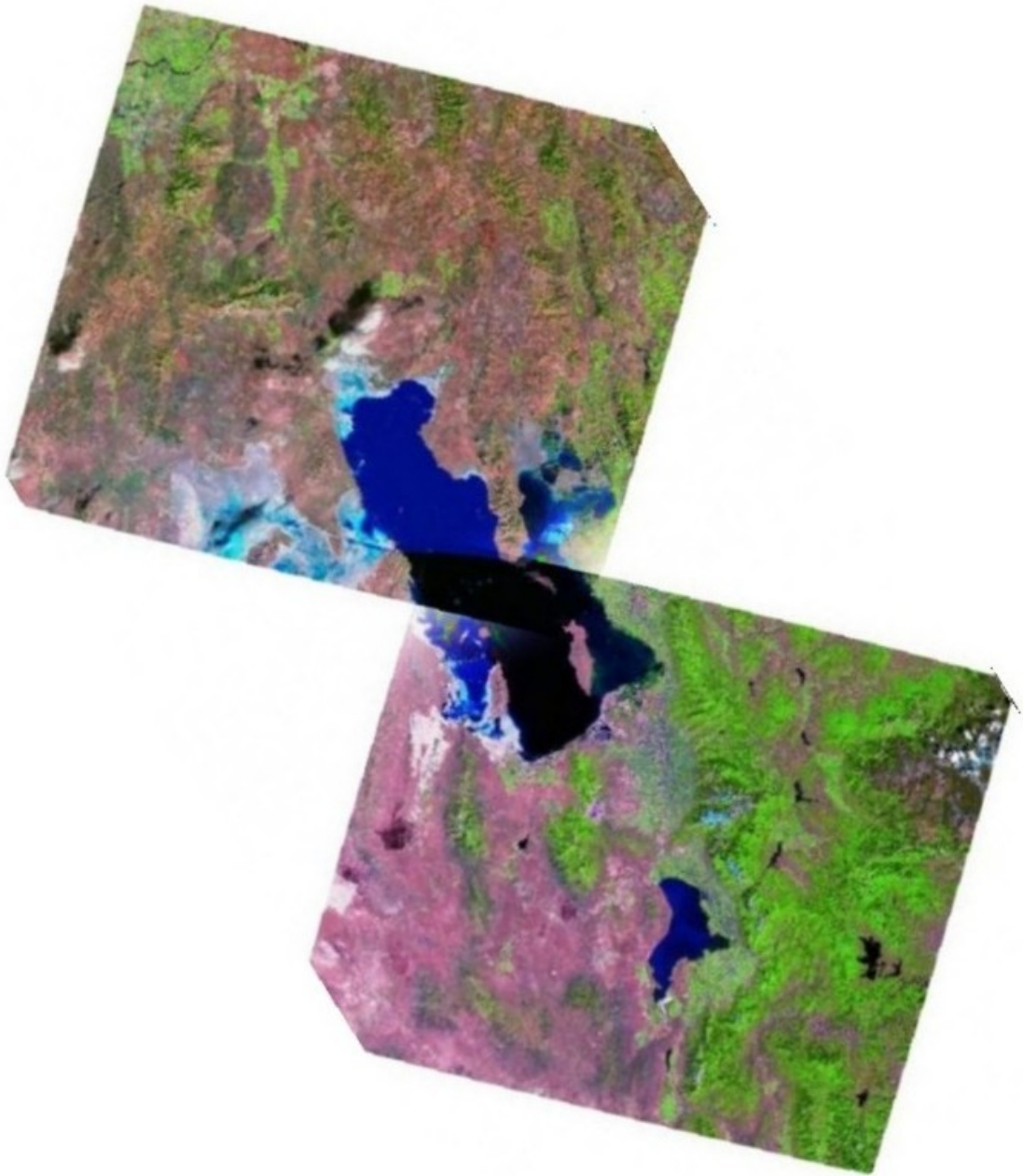
Using the list developed from our graphical analysis, each of the sources on the list we analyzed to determine which might have a significant amount of fugitive dust emissions during high wind events. The criteria used in this analysis were: specific site information (size, operations schedule, relation to monitoring sites), type of business, and past fugitive dust emissions. We determined that the sources in Table 3 have the most potential impact and are the sources for which an analysis of BACM was performed. If high wind events continue to impact the Salt Lake area, future revisions of the NEAP can look at smaller un-permitted sources for further fugitive dust emissions improvements.

*Table 3. Final Source Table*

<b>Company name</b>	<b>Source ID</b>	<b>Source Name</b>	<b>Emissions (Tons/Year)</b>	<b>Pollutant</b>
Kennecott Utah Copper Corporation	10346	Smelter & Refinery	193.75	PM10
Kennecott Utah Copper Corporation	10572	Power Pit/ Lab/ Tailings Impoundment	175.19	PM10
C. E. Butters Realty & Construction	11840	Pleasant View Pit (Crushing/Screening)	4.28	PM10
Gordon C. Orton Construction Co. Inc.	12242	Aggregate Processing	1.89	PM10
Jack B. Parsons Company	10042	McGuire Pit Crushing Operation	4.58	PM10
Jack B. Parsons Company	10972	West Ogden Operations	16.62	PM10
Jack B. Parsons Company	12323	Rocky Point Aggregate Processing Plant	0.98	PM10
Geneva Rock Products	10387	Salt Lake Concrete Batch Plant G16	17.25	PM10
Staker & Parson Companies	10408	Beck Street North Pit and Hot Plant	29.57	PM10
Staker & Parson Companies	10411	Beck Street South Hot Plant	11.40	PM10
Geneva Rock Products	10820	Orem Asphalt Plant F3 & Batch Plants	44.76	PM10
Geneva Steel	10796	Steel Manufacturing Facility	17.56	PM10

In the next section, the current fugitive dust control agreements are listed for the companies in table 3 and each current agreement or control strategy is analyzed to determine whether BACM is in place or needs to be developed. For sources that do not currently have BACM in place future commitments for BACM development are listed.

*Figure 11. Composite Satellite Image of the Great Salt Lake in 1998*



*Figure 12. Composite Satellite Image of the Great Salt Lake in 2002*

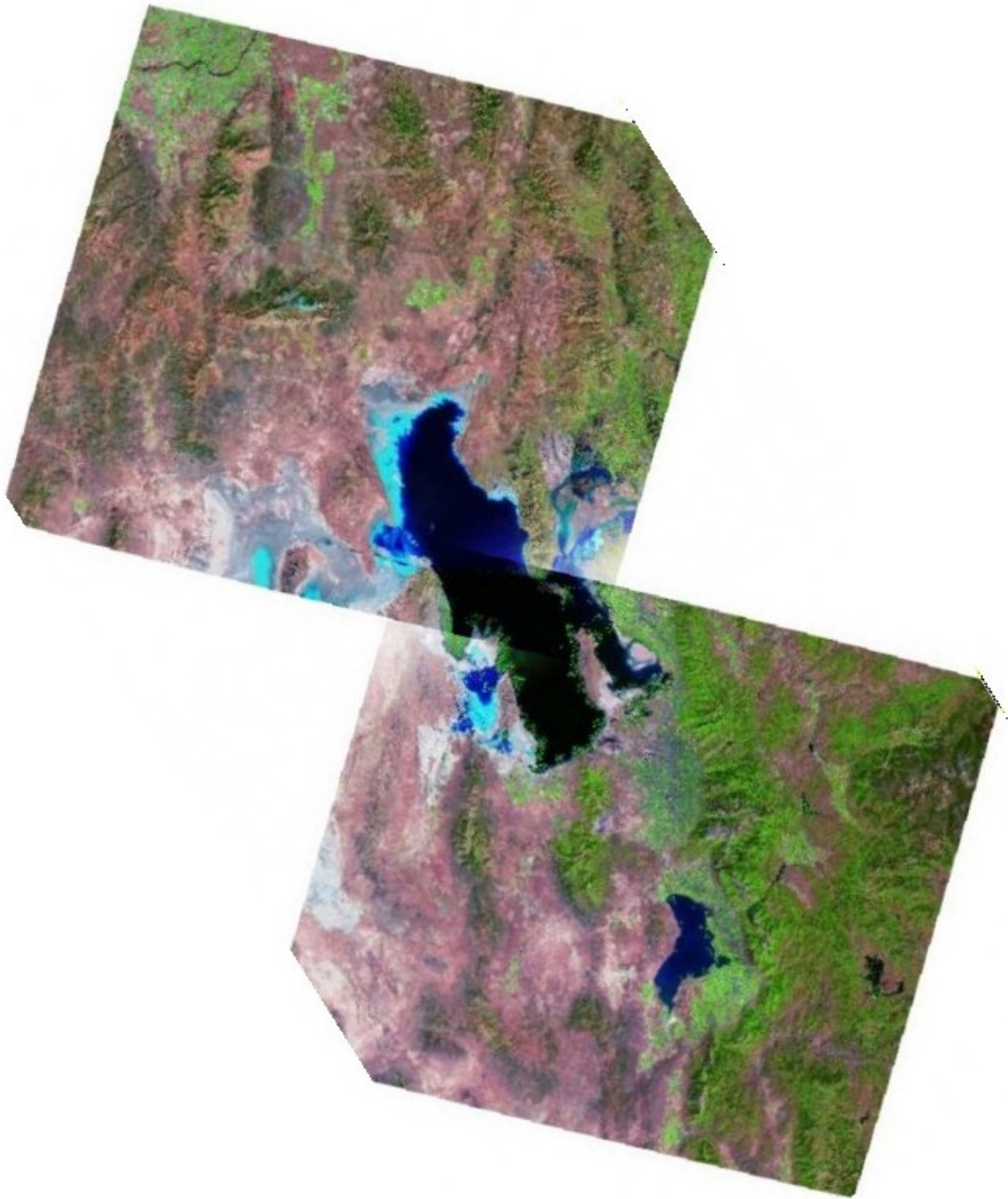




Figure 13. Source Map for the Hawthorne Monitoring Site, Indicating the 1 Mile and 10km Radius Circles Surrounding the Monitor

### Hawthorne Monitor & Sites - 10 km

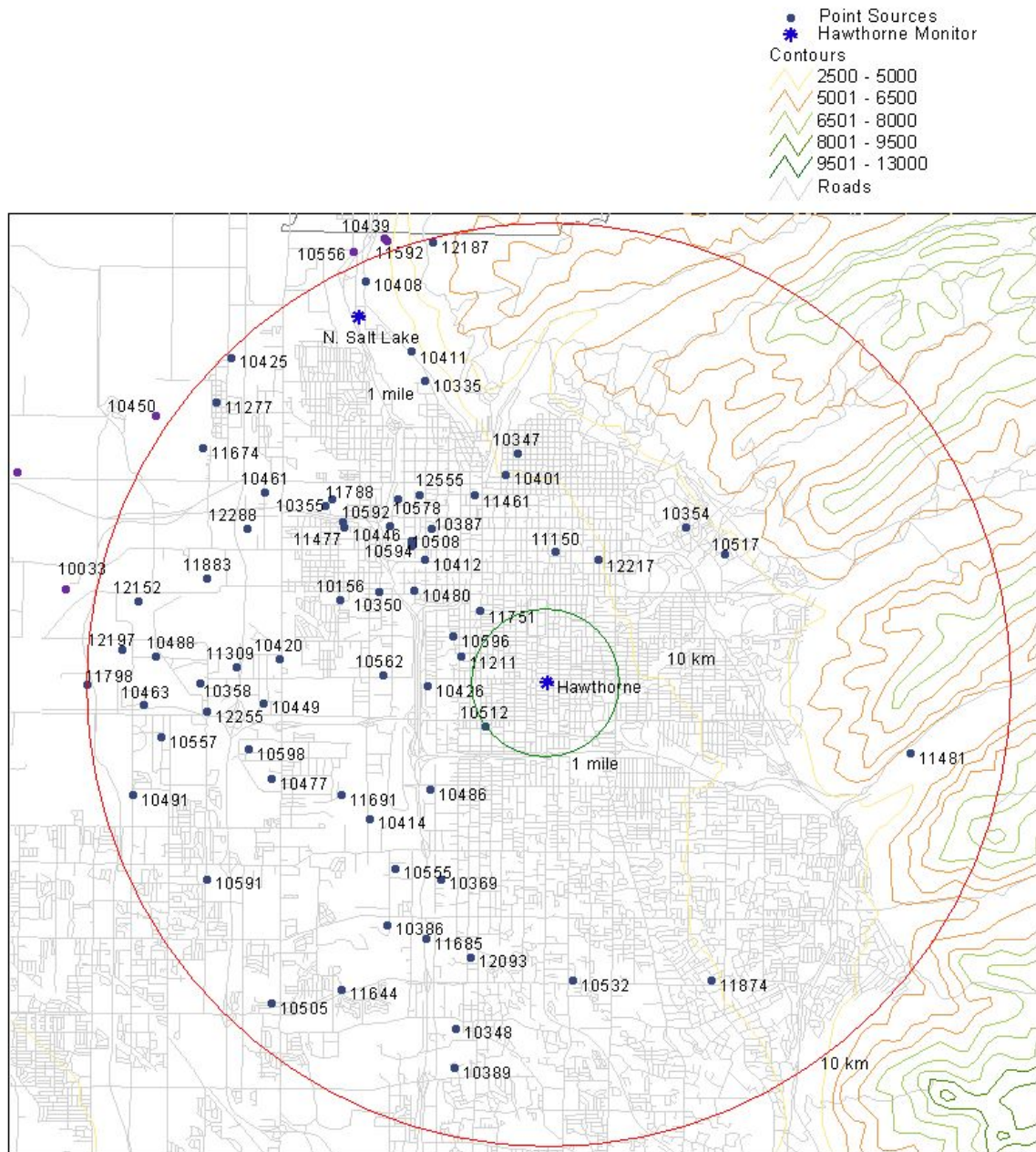




Figure 14. Source Map for the North Salt Lake Monitoring Site, Indicating the 1 Mile and 10km Radius Circles Surrounding the Monitor

### North Salt Lake Monitor & Sites - 10 km

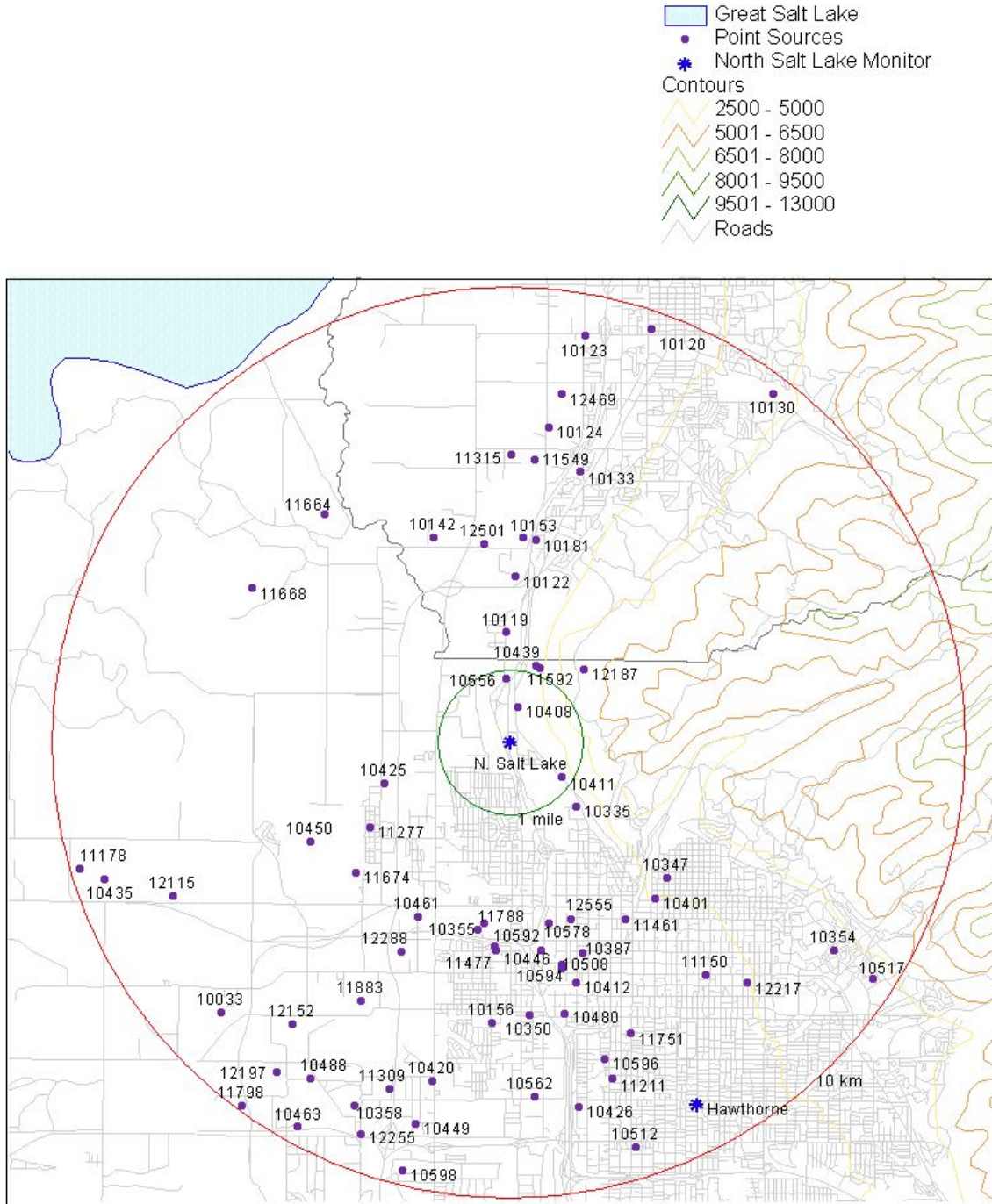


Figure 15. Source Map for the Ogden #2 Monitoring Site, Indicating the 1 Mile and 10km Radius Circles Surrounding the Monitor

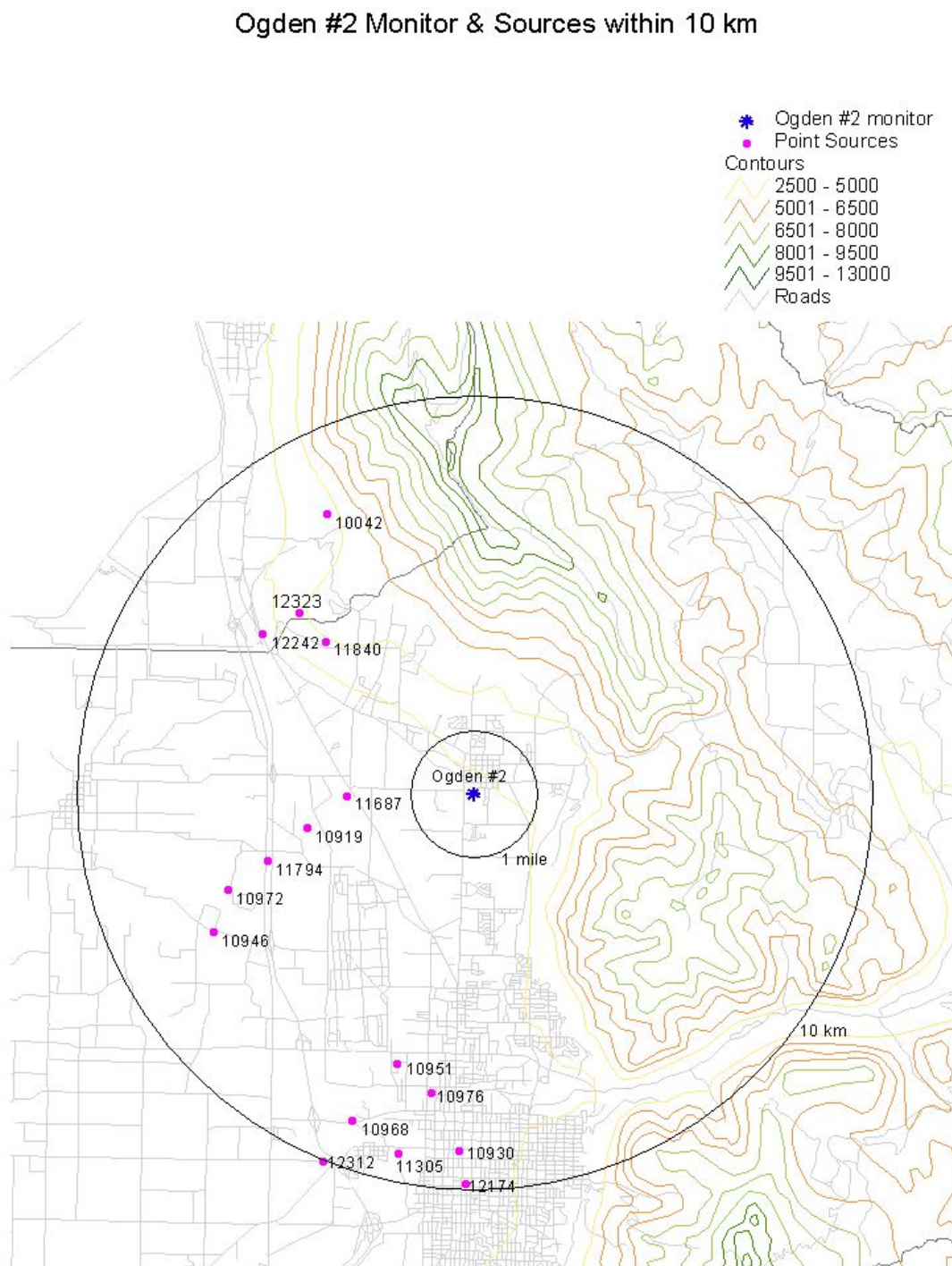
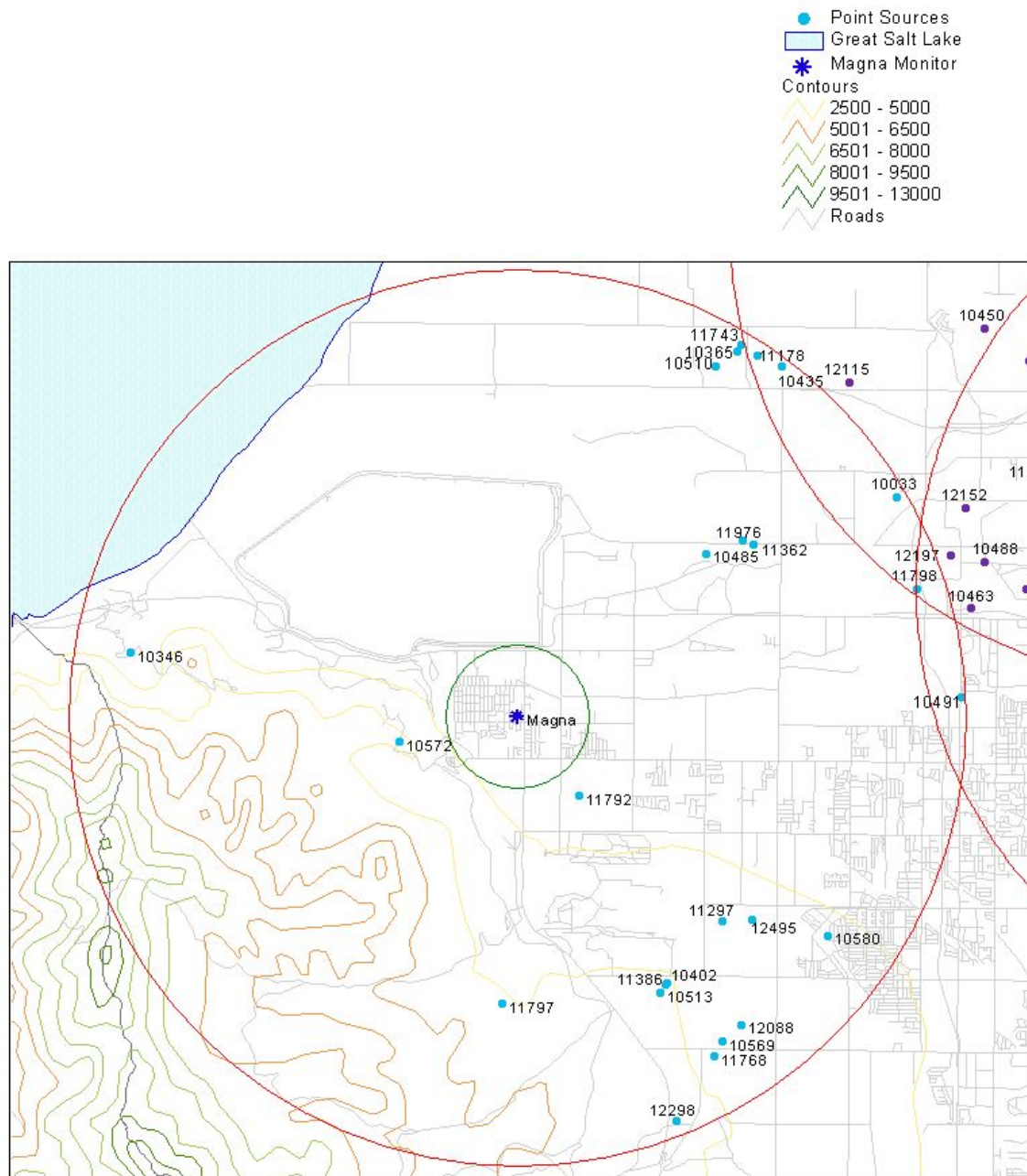


Figure 16. Source Map for the Magna Monitoring Site, Indicating the 1 Mile and 10km Radius Circles Surrounding the Monitor

### Magna Monitor & Sites - 10 km



### 3. Current And Future Control Strategies

The following section is laid out in such a way that the future BACM program and agreements that the Utah DAQ will develop are enumerated first as well as the current and future studies to determine the impact and content of crustal PM10 from the Great Salt Lake beach areas. The future BACM and research programs are followed by the current rules and agreements that we have in place for both general and specific sources, as developed in through the Utah PM10 SIP process, Title 5 permitting, and other Utah Administrative rules.

In order to further control fugitive dust and reduce natural exceedences of the PM10 NAAQS the Utah Division of Air Quality will pursue the following plan to reduce future fugitive dust impacts.

1. On an annual basis:
  - a. The DAQ will contact each of the 13 potential fugitive dust PM10 sources in Table 3 during their annual inspection to ensure that they are conforming to the Utah PM10 SIP as well as to develop further fugitive dust control measures if necessary.
  - b. The list of sources that are potentially contributing to PM10 NAAQS exceedences (Table 3) will be evaluated on an annual basis or when further natural PM10 exceedences occur to ensure that the list incorporates all sources that may be having an impact on the natural exceedence.
2. During a high wind event:
  - a. The DAQ will monitor weather conditions with the help of the National Weather service office in Salt Lake City in order to predict high wind events.
  - b. Once a high wind event has been forecast, the DAQ will contact each potential PM10 fugitive dust source on the final source list prior to the event to ensure that they are employing BACM.
3. After a natural PM10 event:
  - a. The DAQ will request confirmation from each of the 13 potential anthropogenic PM10 sources in Table 3 that BACM was in place during the event and submit that confirmation with the documentation package to EPA.

Although future plans may help develop more nuanced BACM, Utah has had a system of control techniques for fugitive dust since 1992 when the current Utah PM10 SIP was developed. The SIP put in place control measures for all fugitive dust sources along the Wasatch Front. The SIP controls dust by implementing control measures for both specific and general PM10 fugitive dust sources. The SIP process introduced RACT and RACM for sources that existed prior to the SIP process and required BACT for new sources and modifications of existing sources. This requirement of BACT is enforced



through Utah administrative rule R307-401. Furthermore, since 1992 the state has implemented and continually updated two administrative rules, which control fugitive dust throughout the state. R307-205 and R307-309 which, taken together, apply to all significant fugitive dust sources in the state. These two rules have allowed the control of sources throughout the state that would not have been controlled by the SIP process. Among other things, these rules require each significant fugitive dust source to develop and implement a site-specific fugitive dust control plan. In effect, an approved dust plan defines BACM for a source, and provides a flexible mechanism for improving dust control over time. As a result of the 1992 PM10 SIP and the administrative rules listed above, sources within Utah have the capacity to fall under RACT, RACM, or BACT. However, the NEP requires BACM for sources that are affected by natural events. Therefore, an analysis is important to determine whether BACM is currently in place at sources that will affect the Salt Lake area during high wind events. This analysis has been preformed for each of the sources listed in *table 3*. Below you will find a table of current control measures for each site as they appear in the sources current approval orders or in the 1992 PM10 SIP as well as whether these current controls meet the requirements of BACM. If the current control measures do not meet the requirements of BACM, further control strategies are listed to bring the controls up to the standard of BACM. In addition, the current agreements for the sources in table 3 are listed in Appendix I as they appear in the 1992 Utah PM10 SIP or as updated in the current Approval Orders. The Utah administrative rules that pertain to fugitive dust (R307-205, R307-401, and R307-309) also are included in that appendix.

*Table 4. Summary of Current Controls Measures for Final Sources*

<b>Company name</b>	<b>Current Control Measures</b>	<b>Do Current Controls Meet BACM</b>	<b>Further Strategies to Meet BACM Requirements</b>
Kennecott Utah Copper Corporation – Bingham Copper Mine	<p>BACT developed under approval order DAQE-178-02 The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>• Speed and distance restrictions on unpaved roads based on an opacity limit of 20%;</li> <li>• Water or chemical sprays on all crushers, screens, and conveyer transfer points</li> <li>• Water or chemical sprays on all uncovered storage piles;</li> <li>• Water or chemical sprays on all waste dump slopes based on 20% opacity limit</li> <li>• Frequent water or chemical sprays on all trafficked roads and areas in the mine to control road dust; and</li> <li>• Wet drilling shall be performed for all blast holes.</li> </ul>	Yes	None based on correlation between BACT and BACM
Kennecott Utah Copper Corporation – Tailing Impoundment & Bonneville Concentrator	<p>The Bonneville Concentrator has been permanently shutdown. BACT developed under approval order DAQE-664-99 for the Tailing Impoundments. The following approved (BACT) control measures are in place:</p>	Yes	None based on correlation between BACT and BACM

	<ul style="list-style-type: none"> <li>• By the end of 2004, the entire south impoundment shall be reclaimed through re-vegetation;</li> <li>• Magnesium Chloride is to sprayed routinely on all used unpaved roads;</li> <li>• Magnesium Chloride must be sprayed on all top, middle, and bottom perimeter roads by May 30 each year and reapplied as needed;</li> <li>• All unpaved road and unpaved work areas must be sprayed by water or approved chemical based on an opacity reading that's not to exceed 20%;</li> <li>• Kennecott must inspect the interior surface, unpaved roads and exterior dike area every 2 weeks or when ever winds are forecast to exceed 25mph in the next 48 hours;</li> <li>• The tailings impoundment will be run at maximum wetness and add no more than 50 acres to have the potential of wind erosion unless stabilized with approved dust control methods;</li> <li>• Exterior tailings impoundment areas shall be stabilized by vegetation or other approved method; and</li> <li>• If the peripheral discharge pipeline will be out of service temporary piping must be in place to insure 95% surface wetness.</li> </ul>		
Kennecott Utah Copper Corporation – Smelter	<p>BACT developed under approval order DAQE-836-00 for Smelter. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>• All roads, parking lots, and service yards must be paved as per the approved fugitive dust plan;</li> <li>• Fugitive dust emissions during construction or demolition shall be controlled using BACT from Utah's fugitive dust plan;</li> <li>• Any open storage piles shall be sprayed with water or approved chemicals, or covered to reduce dust; and</li> <li>• Slag from the concentrator bin shall be controlled with water sprays at all times.</li> </ul>	Yes	None based on correlation between BACT and BACM
C. E. Butters Realty & Construction	<p>BACT developed under approval order DAQE-798-01. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>• Water or chemical sprays on all crushers, screens, conveyer transfer points, and product piles;</li> <li>• Areas used by mobile equipment and the long-haul road must not exceed a 20% opacity limit;</li> <li>• The haul road must not exceed 0.6 miles and speed on the road must not exceed 10mph;</li> </ul>	Yes	None based on correlation between BACT and BACM

	<ul style="list-style-type: none"> <li>Any open storage piles shall be sprayed with water or approved chemicals, or covered to reduce dust;</li> <li>All unpaved roads and operational areas used by mobile equipment shall be sprayed with water and/or chemically treated to control fugitive dust based on a 20% opacity limit; and</li> <li>Control of stripped or disturbed areas is required 24-7.</li> </ul>		
Gordon C. Orton Construction Co. Inc.	<p>BACT developed under approval order DAQE-808-01. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>Water or chemical sprays on all crushers, screens, conveyer transfer points, and product piles;</li> <li>Areas used by mobile equipment and the long-haul road must not exceed a 20% opacity limit;</li> <li>The haul road must not exceed 0.5 miles and speed on the road must not exceed 15mph;</li> <li>Any open storage piles shall be sprayed with water or approved chemicals, or covered to reduce dust;</li> <li>All unpaved roads and operational areas used by mobile equipment shall be sprayed with water and/or chemically treated to control fugitive dust based on a 20% opacity limit; and</li> <li>Control of stripped or disturbed areas is required 24-7.</li> </ul>	Yes	None based on correlation between BACT and BACM
Jack B. Parsons Company – McGuire Pit	<p>BACT developed under approval order DAQE-006-02 for the McGuire Pit. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>Water or chemical sprays on all crushers, screens, conveyer transfer points, and product piles;</li> <li>Areas used by mobile equipment and the long-haul road must not exceed a 20% opacity limit;</li> <li>The haul road must not exceed 0.4 miles and speed on the road must not exceed 15mph;</li> <li>Any open storage piles shall be sprayed with water or approved chemicals, or covered to reduce dust; and</li> <li>All unpaved roads and operational areas used by mobile equipment shall be sprayed with water and/or chemically treated to control fugitive dust based on a 20% opacity limit.</li> </ul>	Yes	None based on correlation between BACT and BACM

Jack B. Parsons Company – West Ogden Ops	<p>BACT developed under approval order DAQE-190-01 for West Ogden Ops. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>• Water or chemical sprays on all crushers, screens, conveyer transfer points, and product piles;</li> <li>• Areas used by mobile equipment and the long-haul road must not exceed a 20% opacity limit;</li> <li>• The haul road must not exceed 0.6 miles and speed on the road must not exceed 15mph;</li> <li>• Any open storage piles shall be sprayed with water or approved chemicals, or covered to reduce dust;</li> <li>• All unpaved roads and operational areas used by mobile equipment shall be sprayed with water and/or chemically treated to control fugitive dust based on a 20% opacity limit; and</li> <li>• Control of stripped or disturbed areas is required during all operations.</li> </ul>	Yes	None based on correlation between BACT and BACM
Geneva Rock Products – Salt Lake Concrete Batch	<p>As developed within the 1992 PM10 SIP section IX.A.6</p> <ul style="list-style-type: none"> <li>• Water or chemical sprays on all crushers, screens, and conveyer transfer points based on an opacity limit of 10%;</li> <li>• Water shall be added to all mined material before the material is moved so that the moisture content is greater than 4.0% and must be maintained at that level throughout processing;</li> <li>• Silt from processing must be maintained at 15% moisture content;</li> <li>• The batcher unit shall be enclosed in a building to control fugitive dust;</li> <li>• The concrete and flyash silos shall be pneumatically loaded and discharged through a baghouse;</li> <li>• The open disturbed area shall be not exceed 150 acres; and</li> <li>• The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant.</li> </ul>	Yes	None based on requirements of BACM and control analysis of current controls
Staker & Parson Companies – Beck St. North Pit	<p>BACT developed under approval order DAQE-569-01 for the Beck St. North Pit. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>• Water or chemical sprays on all crushers, screens, conveyer transfer points, and product piles;</li> <li>• Areas used by mobile equipment shall be sprayed with water and/or chemically treated to control fugitive dust based on a 20% opacity limit;</li> <li>• The haul road must not exceed 2 miles and speed on the road must not exceed</li> </ul>	Yes	None based on correlation between BACT and BACM



	<ul style="list-style-type: none"> <li>10mph; and</li> <li>The open disturbed area shall be not exceed 100 acres.</li> </ul>		
Staker & Parson Companies – Beck St. South Plant	<p>BACT developed under approval order DAQE--569-01 for the Beck St. South Plant. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>Control via water or chemical spray shall be required at all times during operations with disturbed or stripped areas;</li> <li>Visible dust emissions from the haul road shall be suppressed with water or chemical spray based on an opacity limit of 20%; and</li> <li>All unpaved roads and unpaved work areas must be sprayed by water or approved chemical. Control is required based on a 20% opacity limit.</li> </ul>	Yes	None based on correlation between BACT and BACM
Geneva Rock Products – Orem Asphalt Plant	<p>BACT developed under approval order DAQE-083-02 for the Orem Asphalt Plant. The following approved (BACT) control measures are in place:</p> <ul style="list-style-type: none"> <li>All unpaved roads and unpaved work areas must be sprayed by water or approved chemical. Control is required 24-7;</li> <li>The haul road must not exceed 1500ft. and speed on the road must not exceed 15mph;</li> <li>The paved haul road shall be periodically swept or sprayed clean as determined by the Executive Secretary;</li> <li>The storage piles shall be watered and must not exceed 10.0 acres; and</li> <li>Limits exist for silt content of daily average production.</li> </ul>	Yes	None based on correlation between BACT and BACM
Geneva Steel - Steel Manufacturing Facility	This facility Is Closed and No Longer Produces Fugitive Dust Emissions.	No	None

## Current Studies

In addition to anthropogenic sources, the DAQ is seeking to determine the impact that the increased beach area around the Great Salt Lake is having on fugitive dust emissions in the Salt Lake area as well as determining the composition of the dust from the new beach areas. To determine the impact and composition of beach dust, the DAQ in conjunction with the Utah Air Monitoring Center (AMC) has developed a research study to collect and analyze PM10 filter data from newly deployed PM10 monitors adjacent to the new beach areas. The monitors have been located adjacent to various beach areas around the lake and will collect 24-hr average PM10 concentrations using the Federal Reference Method. Once a sufficient amount of PM10 data has been collected, during both normal and high wind conditions, the data will be analyzed to determine the composition of dust.

The DAQ will use this speciation data to attempt to develop a source profile for the lakebed dust in order to aid future analyses of natural wind events and clear up some of the debate between the anthropogenic and non-anthropogenic sources of fugitive dust during natural PM10 events. It is the intent of the DAQ to more accurately determine the sources of fugitive dust during high wind events through this study as well as to ascertain whether lakebed dust poses an increased health risk to the public due to its composition.

### ***Element 5: Periodic Review***

The NEAP will be reviewed every five years or sooner, if sufficient natural events occur to necessitate a review or revision of this plan.

### **Stakeholders**

The State worked with stakeholders in the development of existing fugitive dust regulations that will make up the enforceable control measures of the NEAP. In addition, stakeholders provided comments during the public comment period and their comments were incorporated into the final NEAP document.

# APPENDIX I

## All Sources:

### Salt Lake and Davis County

#### PM10 SIP Section 2.a.I

*All unpaved operational areas which are used by mobile equipment shall be water sprayed and/or chemically treated to reduce fugitive dust. Control is required at all times (24 hours per day every day) for the duration of the project/operation. The application rate of water shall be a minimum of 0.25 gallons per square yard.*

#### Section IX, Part H.2, page 29

*Application shall be made at least once every two hours during all times the installation is in use unless daily rainfall exceeds .10 of an inch or the road is in a muddy condition or if it is covered with snow or if the ambient temperature falls below freezing or if the surfaces are in a moist/damp condition. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water treatment shall be kept for all periods when the installation is in operation. The records shall include the following items:*

- A. Date*
- B. Number of treatments made, dilution ratio, and quantity*
- C. Rainfall received, if any, and approximate amount*
- D. Time of day treatments were made*

*Records of treatment shall be made available to the Executive Secretary upon request and shall include a period of two years ending with the date of the request.*

### Utah County

#### PM10 SIP Section 1.a.H

*All unpaved operational areas which are used by mobile equipment shall be water sprayed and/or chemically treated to reduce fugitive dust. Control is required at all times (24 hours per day every day) for the duration of the project/operation. The application rate of water shall be a minimum of 0.25 gallons per square yard.*

#### Section IX, Part H.1, page 3

*Application shall be made at least once every two hours during all times the installation is in use unless daily rainfall exceeds .10 of an inch or the road is in a muddy condition or if it is covered with snow or if the ambient temperature falls below freezing or if the surfaces are in a moist/damp condition. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*

- 1. Date*

2. Number of treatments made, dilution ratio, and quantity
3. Rainfall received, if any, and approximate amount
4. Time of day treatments were made

*Records of treatment shall be made available to the Executive Secretary upon request and shall include a period of two years ending with the date of the request.*

## **Administrative Rules**

### **R307-205**

#### *R307-205-1. Applicability.*

- (1) Except where otherwise specified, R307-205 applies statewide.*
- (2) The provisions of R307-205 shall not apply to any sources for which limitations for fugitive dust or fugitive emissions are assigned pursuant to R307-401, R307-305, or R307-307 nor shall they apply to agricultural or horticultural activities.*
- (3) The following definitions apply throughout R307-205:*  
*"Material" means sand, gravel, soil, minerals or other matter which may create fugitive dust.*  
*"Road" means any public or private road.*

#### *R307-205-2. Fugitive Emissions.*

*Fugitive emissions from sources in areas outside Davis, Salt Lake and Utah Counties, Ogden City and any nonattainment area for PM10 and which were constructed before April 25, 1971, shall not exceed 40% opacity. Fugitive emissions from sources constructed after April 25, 1971, shall not exceed 20% opacity.*

#### *R307-205-3. Fugitive Dust.*

*(1) Storage and Handling of Aggregate Materials. Any person owning, operating or maintaining a new or existing material storage, handling or hauling operation shall minimize fugitive dust from such an operation. Such control may include the use of enclosures, covers, stabilization or other equivalent methods or techniques as approved by the executive secretary.*

#### *(2) Construction and Demolition Activities.*

*(a) Any person engaging in clearing or leveling of land greater than one-quarter acre in size, earthmoving, excavation, or movement of trucks or construction equipment over cleared land greater than one-quarter acre in size or access haul roads shall take steps to minimize fugitive dust from such activities. Such control may include watering and chemical stabilization of potential fugitive dust sources or other equivalent methods or techniques approved by the executive secretary.*

*(b) The owner or operator of any land area greater than one-quarter acre in size that has been cleared or excavated shall take measures to prevent fugitive particulate matter from becoming airborne. Such measures may include:*

- (i) planting vegetative cover,*
- (ii) providing synthetic cover,*
- (iii) watering,*
- (iv) chemical stabilization,*
- (v) wind breaks, or*
- (vi) other equivalent methods or techniques approved by the executive secretary.*

*(c) Any person engaging in demolition activities including razing homes, buildings, or other structures or removing paving material from roads or parking areas shall take steps to minimize fugitive dust from such activities. Such control may include watering and chemical stabilization or other equivalent methods or techniques approved by the executive secretary.*

#### *R307-205-4. Roads.*

*(1) Any person planning to construct or operate a new unpaved road which is anticipated to have an average daily traffic volume of 150 vehicle trips per day or greater, averaged over a consecutive five day period, shall submit a notice of intent to construct or operate such a road to*

*the executive secretary pursuant to R307-401. Such notice shall include proposed action to minimize fugitive dust emissions from the road.*

*(2) The executive secretary may require persons owning, operating or maintaining any new or existing road, or having right-of-way easement or possessory right to use the same to supply traffic count information as determined necessary to ascertain whether or not control techniques are adequate or additional controls are necessary.*

*(3) Any person who deposits materials which may create fugitive dust on a public or private paved road shall clean the road promptly.*

*R307-205-5. Mining Activities.*

*(1) Fugitive dust, construction activities, and roadways associated with mining activities are regulated under the provisions of R307-205-5 and not by R307-205-3 and 4.*

*(2) Any person who owns or operates a mining operation shall minimize fugitive dust as an integral part of site preparation, mining activities, and reclamation operations.*

*(3) The fugitive dust control measures to be used may include:*

*(a) periodic watering of unpaved roads,*

*(b) chemical stabilization of unpaved roads,*

*(c) paving of roads,*

*(d) prompt removal of coal, rock minerals, soil, and other dust-forming debris from roads and frequent scraping and compaction of unpaved roads to stabilize the road surface,*

*(e) restricting the speed of vehicles in and around the mining operation,*

*(f) revegetating, mulching, or otherwise stabilizing the surface of all areas adjoining roads that are a source of fugitive dust,*

*(g) restricting the travel of vehicles on other than established roads,*

*(h) enclosing, covering, watering, or otherwise treating loaded haul trucks and railroad cars, to minimize loss of material to wind and spillage,*

*(i) substitution of conveyor systems for haul trucks and covering of conveyor systems when conveyed loads are subject to wind erosion,*

*(j) minimizing the area of disturbed land,*

*(k) prompt revegetation of regraded lands,*

*(l) planting of special windbreak vegetation at critical points in the permit area,*

*(m) control of dust from drilling, using water sprays, hoods, dust collectors or other controls approved by the executive secretary,*

*(n) restricting the areas to be blasted at any one time,*

*(o) reducing the period of time between initially disturbing the soil and revegetating or other surface stabilization,*

*(p) restricting fugitive dust at spoil and coal transfer and loading points,*

*(q) control of dust from storage piles through use of enclosures, covers, or stabilization and other equivalent methods or techniques as approved by the executive secretary, or*

*(r) other techniques as determined necessary by the executive secretary.*

*(4) Any person owning or operating an existing mining operation in an actual area of nonattainment for particulate or an existing mining operation outside an actual area of nonattainment from which fugitive dust impacts an actual area of nonattainment for particulate shall submit plans for control of fugitive dust from such operations to the executive secretary for approval no later than September 29, 1981, 180 days after the effective date of this regulation.*

*R307-205-6. Tailings Piles and Ponds.*

*(1) Fugitive dust, construction activities, and roadways associated with tailings piles and ponds are regulated under the provisions of R307-205-6 and not by R307-205-3 and 4.*

*(2) Any person owning or operating an existing tailings operation where fugitive dust results from grading, excavating, depositing, or natural erosion or other causes in association with such operation shall take steps to minimize fugitive dust from such activities. Such controls may include:*

- (a) watering,
  - (b) chemical stabilization,
  - (c) synthetic covers,
  - (d) vegetative covers,
  - (e) wind breaks,
  - (f) minimizing the area of disturbed tailings,
  - (g) restricting the speed of vehicles in and around the tailings operation, or
  - (h) other equivalent methods or techniques which may be approvable by the executive secretary.
- (3) Any person owning or operating an existing tailings operation in a nonattainment area for particulate or an existing mining operation outside an actual area of nonattainment from which fugitive dust impacts an actual area of nonattainment for particulate shall submit plans for control of fugitive dust from such operations to the executive secretary for approval no later than September 29, 1981, 180 days after the effective date of this regulation.

### **R307-309**

#### *R307-309-1. Applicability and Definitions.*

(1) *Applicability.* R307-309 applies to all sources of fugitive dust and fugitive emissions located in Davis, Salt Lake and Utah Counties, Ogden City, and any nonattainment area for PM10, except as specified in (2) below. Any source located in those areas for which limitations for fugitive dust or fugitive emissions are assigned pursuant to R307-401 is subject to R307-309 on May 4, 1999, unless the source has an operating permit issued under R307-415 prior to that date. If the source has an operating permit, the source is subject to R307-309 on the date of permit renewal or permit reopening as specified in R307-415, whichever occurs first.

#### *(2) Exemptions.*

- (a) The provisions of R307-309 do not apply to agricultural or horticultural activities.
- (b) Any source which is subject to R307-305-2 through 7 or R307-307 is exempt from all provisions of R307-309 except for R307-309-4.
- (c) Any source regulated by R307-205-5 or R307-205-6 is exempt from all provisions of R307-309 except for R307-309-4.
- (3) The following additional definitions apply to R307-309:  
*"Material"* means sand, gravel, soil, minerals or other matter which may create fugitive dust.  
*"Road"* means any public or private road.

#### *R307-309-2. Fugitive Emissions.*

*Fugitive emissions from any source shall not exceed 15% opacity.*

#### *R307-309-3. General Requirements for Fugitive Dust.*

(1) *Opacity caused by fugitive dust shall not exceed:* (a) 10% at the property boundary; and (b) 20% on site unless an approval order issued under R307-401 or a dust control plan specifies a lower level; except when the wind speed exceeds 25 miles per hour and the owner or operator is taking appropriate actions to control fugitive dust. If the source has a dust control plan approved by the executive secretary, control measures in the plan are considered appropriate. Wind speed may be measured by a hand-held anemometer or equivalent device.

(2) Any source with a dust control plan approved by the executive secretary prior to March 4, 1999, shall review and revise the plan in accordance with R307-309-4 below. The revised plan shall be submitted to the executive secretary no later than May 4, 1999.

#### *R307-309-4. Fugitive Dust Control Plan.*

(1) Any person owning or operating a new or existing source of fugitive dust, including storage, hauling or handling operations or engaging in clearing or leveling of land one-quarter acre or greater in size, earthmoving, excavation, or movement of trucks or construction equipment over cleared land one-quarter acre or greater in size or access haul roads shall submit a plan to control fugitive dust to the executive secretary no later than 30 days after the source becomes

*subject to the rule. The plan shall address fugitive dust control strategies for the following operations as applicable:*

- (a) Material Storage;*
- (b) Material handling and transfer;*
- (c) Material processing;*
- (d) Road ways and yard areas;*
- (e) Material loading and dumping;*
- (f) Hauling of materials;*
- (g) Drilling, blasting and pushing operations;*
- (h) Clearing and leveling;*
- (i) Earth moving and excavation;*
- (j) Exposed surfaces;*
- (k) Any other source of fugitive dust.*
- (2) Strategies to control fugitive dust may include:*
  - (a) Wetting or watering;*
  - (b) Chemical stabilization;*
  - (c) Enclosing or covering operations;*
  - (d) Planting vegetative cover;*
  - (e) Providing synthetic cover;*
  - (f) Wind breaks;*
  - (g) Reducing vehicular traffic;*
  - (h) Reducing vehicular speed;*
  - (i) Cleaning haul trucks before leaving loading area;*
  - (j) Limiting pushing operations to wet seasons;*
  - (k) Paving or cleaning road ways;*
  - (l) Covering loads;*
  - (m) Conveyor systems;*
  - (n) Boots on drop points;*
  - (o) Reducing the height of drop areas;*
  - (p) Using dust collectors;*
  - (q) Reducing production;*
  - (r) Mulching;*
  - (s) Limiting the number and power of blasts;*
  - (t) Limiting blasts to non-windy days and wet seasons;*
  - (u) Hydro drilling;*
  - (v) Wetting materials before processing;*
  - (w) Using a cattle guard before entering a paved road;*
  - (x) Washing haul trucks before leaving the loading site; or*
  - (y) Terracing.*

*(3) Each source shall comply with all provisions of the fugitive dust control plan as approved by the executive secretary.*

*R307-309-5. Storage, Hauling and Handling of Aggregate Materials.*

*Any person owning, operating or maintaining a new or existing material storage, handling or hauling operation shall prevent, to the maximum extent possible, material from being deposited onto any paved road other than a designated deposit site. Any such person who deposits materials which may create fugitive dust on a public or private paved road shall clean the road promptly.*

*R307-309-6. Construction and Demolition Activities.*

*Any person engaging in clearing or leveling of land with an area of one-quarter acre or more, earthmoving, excavating, construction, demolition, or moving trucks or construction equipment over cleared land or access haul roads shall prevent, to the maximum extent possible, material from being deposited onto any paved road other than a designated deposit site. Any such person*

*who deposits materials which may create fugitive dust on a public or private paved road shall clean the road promptly.*

**R307-309-7. Roads.**

*(1) Any person responsible for construction or maintenance of any existing road or having right-of-way easement or possessing the right to use the same whose activities result in fugitive dust from the road shall minimize fugitive dust to the maximum extent possible. Any such person who deposits materials which may create fugitive dust on a public or private paved road shall clean the road promptly.*

**(2) Unpaved Roads.**

*(a) When unpaved roads have an average daily traffic volume of less than 150 vehicle trips per day, averaged over a consecutive 5-day period, fugitive dust shall be minimized to the maximum extent possible.*

*(b) When unpaved roads have an average daily traffic volume of 150 vehicle trips per day or greater, averaged over a consecutive 5 day period, control techniques shall be used which are equal to or better than 2-inch bituminous surface.*

*(c) Any person responsible for construction or maintenance of any new or existing unpaved road shall prevent, to the maximum extent possible, the deposit of material from the unpaved road onto any intersecting paved road during construction or maintenance. Any person who deposits materials which may create fugitive dust on a public or private paved road shall clean the road promptly.*

**R307-401**

**(Set's forth requirement of BACT for all new or modified sources)**

**R307-401-6. Conditions for Issuing Approval Order.**

*The executive secretary shall issue an approval order if it is determined through plan review that the following conditions have been met:*

*(1) The degree of pollution control for emissions, to include fugitive emissions and fugitive dust, is at least best available control technology except as otherwise provided in Title R307.*

*(2) The proposed installation will be in accord with applicable requirements of: Utah Title R307; National Standards of Performance for New Stationary Sources; National Primary and Secondary Ambient Air Quality Standards; National Emission Standards for Hazardous Air Pollutants; new source review criteria; maximum allowable increase and maximum allowable concentration requirements for Prevention of Significant Deterioration; the State Implementation Plan for the area, if the area is classified as a nonattainment or maintenance area; and new source requirements for nonattainment areas under the Federal Clean Air Act.*

*(3) The executive secretary shall issue an approval order under R307-405-6 for a major source or major modification which consumes more than 50% of the increments in R307-405-4 only after receiving the approval of the Board.*

**Specific PM10 Sources:**

**Kennecott Bingham Copper Mine**

**Approval Order DAQE-178-02**

**Roads and Fugitive Dust**

- 1. Kennecott shall abide by a fugitive dust control plan acceptable to the Executive Secretary for control of all dust sources associated with the Bingham Canyon mine. The current version of the fugitive dust control plan is attached as Appendix B. This plan shall contain sufficient controls to prevent an increase in PM<sub>10</sub> emissions above those modeled for this AO. The limitations and conditions*



*in the fugitive dust control plan shall not be changed without prior approval by the Executive Secretary.*

*The haul road length or speed or any other parameters used to calculate the emissions that would change the emissions if changed shall not be increased above the limitations set in the fugitive dust control plan without prior approval in accordance with R307-401, UAC.*

- 2. The facility shall abide by all applicable requirements of UAC R307-205 and R307-309 for Fugitive Emission and Fugitive Dust sources. The provisions of R307-205 and 309 shall not apply to any sources for which limitations for fugitive dust or fugitive emissions are assigned pursuant to R307-401 or R307-305 nor shall they apply to agricultural or horticultural activities.*
- 3. Control of disturbed or stripped areas is required at all times (24 hours per day every day) for the duration of the project/operation until the area is reclaimed. Records of treatment and/or reclamation shall be kept for all periods when the plant is in operation.*
- 4. Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15-second intervals over a six-minute period, however, shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary or the Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made one-half the vehicle length or greater behind the vehicle and at approximately one-half the height of the vehicle or greater. The accumulated six readings shall be averaged for the compliance value.*
- 5. Water sprays or chemical dust suppression sprays shall be installed at the following points that are not enclosed or have baghouses to control fugitive emissions:*
  - A. All crushers*
  - B. All screens*
  - C. All conveyor transfer points*

*The sprays shall operate whenever dry conditions warrant or as determined necessary by the Executive Secretary.*

- 6. All uncovered storage piles shall be sprayed with water or dust suppressants to minimize generation of fugitive dusts, as dry conditions warrant or as determined necessary by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation.*
- 7. The owner/operator shall provide to the Executive Secretary for approval a plan to keep opacity on active waste slopes at less than 20% opacity. Average opacity emissions from the active waste dump push slopes shall not exceed 20%. To insure that 20% opacity is not exceeded, the waste dump slopes shall be monitored by the owner/operator.*

*If the 20% opacity limitation cannot be met on any waste dump slope, action shall be initiated to prevent excesses of 20% opacity by applying additional and/or alternate control measures, as defined in the fugitive dust control plan, as approved by the Executive Secretary.*

*Opacity observations shall be conducted in accordance with 40 CFR 60, Appendix A, Method 9 with the following exceptions:*

*Opacity observations shall only be taken while a batch of dumped material is in motion.*

*One reading shall consist of an accumulation of three (3) minutes of trigger opacity observations taken over the material in motion.*

8. *If the owner/operator or the Executive Secretary determines that the trigger opacity is being exceeded and existing alternate control measures have been exhausted, the owner/operator shall meet with the Executive Secretary, or the Executive Secretary's staff, to discuss additional or modified fugitive dust controls/operational practices and an implementation schedule for such within five (5) working days after verbal notification by either party.*
9. *Owner/operator shall use frequent watering or approved chemical dust suppressant to control road dust from all trafficked roads and areas in the mine. Owner/operator shall submit an annual road dust control report, in conjunction with the fugitive dust control plan, by February 1 of each calendar year, containing as a minimum the following:*
  - A. *A description of what dust control measures are planned for the coming year*
  - B. *A report of what dust control measures were actually completed during the past year*
  - C. *Specific elements of the report will include:*
    1. *A map of all trafficked areas and roads associated with the mine, indicating which areas are planned for treatments with water and/or approved chemical dust suppressant.*
    2. *A description of what chemical dust suppressant will be used if used and how it will be applied (application rate, application frequency, dilution rate, special application procedure, scarification, etc.).*
    3. *A list of equipment dedicated either full or part time to work area and road dust control (# of water trucks, water capacity, # graders, etc.).*
    4. *A quantification of how much dust suppressant (gallons, tons) was applied the previous year, and when and where it was applied.*
    5. *A quantification of how much watering was accomplished the previous year (gallons, water truck operating hours).*
10. *Wet drilling shall be performed for all blast holes.*

### **Kennecott Utah Copper - Bonneville Concentrator**

The Bonneville Concentrator has been permanently shut down and the storage piles referenced in the PM10 SIP no longer exist and are not approved by any approval order.

### **Kennecott Utah Copper - Tailings Impoundment Approval Order DAQE-664-99**

4. *This AO shall apply to both the North and South Tailings Impoundment.*

*By the end of the year 2004, the entire surface area of the South Tailings Impoundment shall be reclaimed as discussed in the June 7, 1994, Tailings Modernization Project Fugitive Dust Abatement Program. Should saturation and/or foundation conditions for subsequent transition step back dikes prohibit complete reclamation of the South Tailings Impoundment by the end of the year 2004, Kennecott shall notify the DAQ in writing of the revised reclamation schedule within 120 days of the revised reclamation schedule. Regardless of any inconsistency between conditions of this AO and Section IX, Part H.2 and Section IX Part H.2.b.BB.b of the PM<sub>10</sub> SIP for Salt Lake County, this AO shall take precedence as provided by R307-305-2, UAC. This AO shall replace the AO, DAQE-627-95, dated July 14, 1995.*

6. *The peripheral discharge system for the North Tailings Impoundment shall consist of an eastern and western half, with each half capable of delivering a minimum of 15,000 gallons per minute (gpm). The system shall be designed for simultaneous or independent operation. The peripheral discharge system shall have the capacity to deliver a minimum of 30,000 gpm.*
7. *The cycle time required for wetting all interior beach areas of the North Impoundment shall be four days. The cycle time for wetting all active interior beach areas of the South Impoundment shall be four days, except during periods of new dike construction, at which time Kennecott shall ensure that the 95% wetness criterion of Condition 13 is met with temporary piping or any other method to achieve adequate wetness if the four day cycle time is not met and conditions warrant.*
8. *If between February 15 and November 15 of each calendar year Kennecott's weather forecast is for a wind speed at more than 25 mph for more than one hour within 48 hours of issuance of the forecast, the procedures listed below shall be followed:*
- A. Alert the DAQ promptly.*
  - B. Continue surveillance and coordination.*

### Roads and Fugitives

10. A. *North Tailings Impoundment*

*To minimize fugitive dust emissions, magnesium chloride or other stabilization methods approved by the executive secretary, shall be applied as necessary on all routinely used, unpaved roadways as discussed in the June 7, 1994, Tailings*

*Modernization Project Fugitive Dust Abatement Program. A copy of the Tailings Modernization Project Fugitive Dust Abatement Program, dated June 7, 1994, is attached to this document. Supplemental stabilization to include other dust causing activities shall be by water sprays or other methods on an as-needed basis or as determined necessary and approved by the executive secretary. The owner/operator shall comply with UAC R307-205 and R307-309. These rules addresses fugitive emissions and fugitive dust requirements.*

*B. South Tailings Impoundment*

*Magnesium chloride or other stabilization methods approved by the executive secretary, shall be reapplied to the top, middle, and lower perimeter unpaved roadways that are routinely used, no later than May 30 of each calendar year and reapplied, as necessary, to minimize these sources of air pollution throughout the year.*

- 1) If the roadways become a source of significant emissions, due to future dry, spring weather conditions, the application of magnesium chloride following wet, winter months shall be done prior to May 30, the date is to be negotiated between Kennecott and the executive secretary.*
- 2) Fugitive road dust generated by: 1) dike raising construction, 2) usage of unpaved roads by traffic prior to the required reapplication, and 3) the decrease in effectiveness of magnesium chloride, shall be stabilized by water sprays or other methods on an as-needed basis or as determined necessary and be approved by the executive secretary.*

- 11. All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. The application of water or chemical treatment shall be used. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition. The opacity shall not exceed 20% during all times the areas are in use, unless it is below freezing. If chemical treatment other than magnesium chloride is to be used, the plan must be approved by the executive secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*

- A. Date*
- B. Number of treatments made, dilution ratio, and quantity*
- C. Rainfall received, if any, and approximate amount*
- D. Time of day treatments were made*

*Records of treatment shall be made available to the executive secretary upon request and shall include a period of two years ending with the date of the request.*

- 12. Between February 15 and November 15 of each calendar year, Kennecott shall inspect the interior surface area, unpaved roads, and exterior dike area at least once every two weeks and daily when 48 hours before a wind event, wind gusts are forecasted to exceed 25 mph for more than one hour by Kennecott's station on top of the Tailings Impoundment.*

13. *The tailings distribution system consisting of the North and South Tailing Impoundment shall be operated to maximize surface wetness. No more than 50 contiguous acres or more than five 5% of the total tailings area shall be permitted to have the potential for wind erosion, unless those areas are stabilized by vegetation, tackifier, or other methods of fugitive dust control approved by the executive secretary. Kennecott shall conduct wind erosion potential grid inspections monthly between February 15 and November 15. The grid inspections may be done concurrently with inspections required by condition #12. Wind erosion potential is the area that is not wet, frozen, vegetated, crusted or treated and has the potential for wind erosion. If it is determined by Kennecott or the executive secretary, that the total surface area with the potential for wind erosion is greater than 5%, or at the request of the executive secretary, grid inspections shall be conducted once every five working days. The revised grid inspection schedule shall be immediately initiated by Kennecott and the results reported to the executive secretary within 24 hours of the inspection. The schedule shall continue to be implemented until Kennecott measures a total surface with the potential for wind erosion of less than or equal to 5%. If Kennecott or the executive secretary, determines that the percentage of wind erosion potential is exceeded, Kennecott shall meet with the executive secretary, or executive secretary's staff, to discuss additional or modified fugitive dust controls/operational practices, and an implementation schedule for such, within five working days following verbal notification by either party.*
14. *Exterior tailings impoundment areas determined by Kennecott or the executive secretary to be sources of excessive fugitive dust shall be stabilized through vegetation cover or other approved methods. The exterior tailings surface area of the North Impoundment shall be revegetated or stabilized so that no more than 5% of the total exterior surface area shall be subject to wind erosion.*
15. *Kennecott shall schedule dike raising or main embankment construction and associated peripheral pipe deactivation in an efficient manner so as to minimize fugitive dust and peripheral discharge pipeline downtime.*

*On the North Tailings Impoundment, as the embankment cells are filled during continual raising of the embankment, dust shall be controlled by the inherent high water content of the hydraulically placed cyclone underflow. Portions of the embankment that are not under active construction shall be kept wet by applying tackifiers or water pumped from the toe ditch. Newly formed exterior slopes shall be stabilized with tackifiers as needed and shall be planted during the next appropriate planting season.*

*On the South Impoundment, fugitive dust generated from disturbed areas created by dike raising, shall be stabilized by water sprays or other methods approved by the executive secretary. The dike raising schedule for the southern-half of the South Tailings Impoundment between April and November 15 shall be as follows:*

- A. *If more than 3,000 feet of contiguous peripheral discharge pipeline may be deactivated for longer than seven working days and conditions warrant, Kennecott shall ensure that the 95% wetness criterion of*

*Condition 13 is met with temporary piping or any other method to achieve adequate wetness.*

- B. If more than 2,500 feet of contiguous peripheral discharge pipeline may be deactivated for longer than 12 working days and conditions warrant, Kennecott shall ensure that the 95% wetness criterion of Condition 13 is met with temporary piping or any other method to achieve adequate wetness.*
- 16. Disturbed or stripped areas of the North Tailings Impoundment shall be kept sufficiently moist during the project to minimize fugitive dust. This control, or other equivalent control methods, shall remain operational during the project cycle and until the areas have been reclaimed. The control methods used shall be operational as needed 24 hours per day, 365 days per year or until the area has been reclaimed.*
- 17. On a quarterly basis, Kennecott shall summarize the following fugitive dust abatement program activities for the executive secretary,*
  - A. Documentation of the wind direction and speed data for days that winds exceeded 25 mph for a period greater than one hour during which no precipitation occurred.*
  - B. Documentation of the grid inspections of the tailings surface area, including the wind erosion potential of the tailings surface area.*
  - C. Documentation showing areas of dust suppressant application and planting during the quarter.*
  - D. Quarterly reports shall be submitted to the executive secretary within 30 days following the end of each calendar quarter.*
- 22. When it is determined by Kennecott or the executive secretary, that additional tailings dust control beyond the above should be considered or tailings Impoundment operational problems are occurring, Kennecott shall meet with the executive secretary, or executive secretary's staff, to discuss proposed fugitive dust controls and implementation schedule within five working days after verbal notification by either party.*
- 23. If a temporary or permanent shutdown that would affect the Kennecott Tailings Impoundment occurs, the following actions shall be taken:*
  - A. Kennecott shall submit an interim dust control plan to the executive secretary, within 30 days of Kennecott's announcement of a temporary shutdown that is expected to last longer than one week. Depending on the duration of the shutdown and the time of year in which the temporary shutdown occurs, interim dust control measures shall include flowing water through the peripheral discharge system, application of tackifiers, use of sprinklers, vegetating, or other controls as new technology becomes available.*

- B. *Kennecott shall follow the dust control procedures for transition off the existing Tailings Impoundment and reclamation of the North Impoundment as proposed in the Tailings Modernization Project Fugitive Dust Abatement Program, June 7, 1994, or a modified plan approved by the executive secretary.*

**Kennecott Smelter**  
**Approval Order DEQE-836-00**

11. *All roads, parking lots, and service yards directly servicing the approved constructed installations listed in Condition #6 shall be paved. Owner/operator shall carry out the Fugitive Dust Control Plan submitted to the Executive Secretary on October 4, 1999, unless and until the owner/operator receives approval from him/her of a different Fugitive Dust Control Plan. The plan shall include a description of dust control practices for paved/unpaved operating areas and paved/unpaved roads located within Kessler Canyon south of State Highway 201.*
12. *Fugitive dust emissions during construction or demolition shall be controlled in accordance with R307-205 and R307-309, UAC.*
13. *The sulfur content of any diesel fuel oil used in the operation shall not exceed 0.05% by weight as determined by ASTM Method D-4294-89 or approved equivalent. The sulfur content shall be tested if directed by the Executive Secretary.*
14. *Any open storage piles shall be watered, covered, or chemically treated to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary.*

*Emissions from the slag concentrator bin shall be controlled with water sprays at all times. The degree of control is a minimum of that required to meet the opacity limitations of Condition #15P.*

**Geneva Rock Products – Salt Lake Concrete Batch Plant**  
**PM10 SIP Section IX.A.6**

*Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:*

- A. *All crushers*  
B. *All screens*  
C. *All conveyor transfer points*

*The sprays shall operate to the extent necessary to keep the equipment operation within the opacity limitation of 10%.*

*4. Water shall be added to the mined material (to be bulldozed) such that before the material is moved, its moisture content, as determined by ASTM Method D-2216 on the - 40 mesh portion of the sample, is greater than 4.0% by weight. This moisture content shall be maintained throughout subsequent crushing, screening and conveying circuits. The silt content of the product shall not exceed 15% by weight on a daily average without*



*prior approval in accordance with Subsection R307-1-3.1, UACR. The moisture and silt content shall be tested if directed by the Executive Secretary using the appropriate ASTM method.*

*5. The following production limits shall not be exceeded without prior approval in accordance with Subsection R307-1-3.1, UACR:*

*A. For the Asphalt Plant:*

- 1. 285 tons/hr*
- 2. 250,000 tons/yr*

*B. For the Concrete Batch Plant:*

- 1. 100 cubic yards/hr*
- 2. 200,000 cubic yards/yr*

*C. For the Aggregate Pits:*

- 1. 900 tons/hr of crushing/screening production*
- 2. 1,000,000 tons of mined material per year*
- 3. 2,000 hours of operation per unit per year*

*Asphalt, concrete and pit production shall be determined through the use of weigh scales and recording of the weights. The records shall be kept on a daily basis. Hours of operation shall be determined by supervisor monitoring and maintaining an operations log.*

*6. The batcher unit on the Ross Plant shall be enclosed in a building as proposed in the notice of intent dated September 4, 1984, and the loading process from the discharge hopper into the mixer trucks shall be controlled by an adjustable boot.*

*7. The cement and flyash silos shall be pneumatically loaded. The displaced air from the silos generated during filling shall be passed through a baghouse. The flow rate through the baghouse shall not exceed 600 ACFM. The baghouse flow rate shall be measured at the request of the Executive Secretary. The method shall be 40 CFR 60, Appendix A, Method 2.*

*8. For the asphalt plant, the following operating parameters shall be maintained within the indicated ranges:*

- A. Pressure drop across the venturi scrubber - 15" nominal, 13" w.g. minimum*
- B. Scrubber liquid flow rate - 300 gallons per minute nominal, 275 gpm minimum 225 gpm They shall be monitored with equipment located such that an inspector can at any time safely read the output. The readings shall be accurate to within the following ranges:*
  - a. Plus or minus 1.0 inch w.c.*
  - b. Plus or minus 15 gpm*

*All instruments shall be calibrated against a primary standard at least once every 90 days. The primary standard shall be specified by the Executive Secretary.*

*9. Under no circumstances shall the percent by weight of recycle asphalt exceed 50%.*

*10. The owner/operator shall use only Number 2 fuel oil or better as fuel or other fuel that can demonstrate sulfur content of less than 0.45% (less than 0.05% after*

December 1993) by weight. If any other fuel is to be used, an approval order shall be required in accordance with Subsection R307-1-3.1, UACR. The sulfur content of any fuel oil burned shall not exceed 0.45% by weight as determined by ASTM Method D-4294-89 or, as appropriate, the sulfur content of any fuel oil burned shall not exceed 0.25 pounds of sulfur per million BTU heat input as determined by ASTM Method D-4294-89. The sulfur content shall be tested if directed by the Executive Secretary. Fuel consumption shall be determined by examination of vendor sales receipts which shall be maintained for two years. These records shall be made available to the Executive Secretary upon request.

11. The open disturbed area shall not exceed 150 acres without prior approval from the Executive Secretary.

12. The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary. The total acreage of the storage piles shall not exceed 75 acres.

### **Geneva Rock Products – Orem Asphalt Plant**

#### **Approval Order DAQE-083-02**

##### **Roads and Fugitive Dust**

15. All unpaved roads and other unpaved operational areas which are used by mobile equipment shall be water sprayed and/or chemically treated to reduce fugitive dust. Control is required at all times (24 hours per day every day) for the duration of the project/operation. The application rate of water shall be a minimum of 0.25 gallons per square yard. Application shall be made as needed during all times the installation is in use unless daily rainfall exceeds 0.10 of an inch or unless the road is in a muddy/damp/moist condition or unless it is below freezing. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:

- A. Date
- B. Number of treatments made, dilution ratio, and quantity
- C. Rainfall received, if any, and approximate amount
- D. Time of day treatments were made

16. The haul road shall not exceed 1,500 feet in length and the vehicle speed along the haul road shall not exceed 15 miles per hour.

These limitations shall not be exceeded. The vehicle speed on the haul road shall be posted, at a minimum, on site at the beginning of the haul road so that it is clearly visible from the haul road.

17. The paved haul road shall be periodically swept or sprayed clean as dry conditions warrant or as determined necessary by the Executive Secretary.
18. The owner/operator shall comply with R307-309, Fugitive Emissions.

19. *The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary. The total acreage of the storage piles shall not exceed 10.0 acres.*
20. *The silt content (minus 200 mesh as determined by ASTM-C-136) of the following products shall not exceed the following values:*

<i>Combined course and fine</i>	
<i>Asphalt aggregate</i>	<i>9.0% by weight on a daily average</i>
<i>Concrete sand</i>	<i>2.5% by weight on a daily average</i>
<i>Concrete aggregate</i>	<i>0.75% by weight on a daily average</i>

*The silt content shall be tested as directed by the Executive Secretary using the appropriate ASTM method.*

**Staker & Parsons Companies – Beck Street North Pit**  
**Approval Order DAQE-569-01**  
**Roads and Fugitive Dust**

18. *Staker shall abide by the fugitive dust control plan included in the Appendix attached to this AO. It shall also abide by all applicable requirements of R307-309 for fugitive emission and fugitive dust sources.*

*Areas used by mobile equipment shall be sprayed with water and/or chemically treated to control fugitive dust. The opacity from these areas shall not exceed 20% when the areas are in use. If chemical treatment is used, it must be approved by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*

*Date*  
*Number of treatments made dilution ratio, and quantity Rainfall received, if any, and approximate amount*  
*Time of day treatments were made*  
*Records of temperature if the temperature is below freezing*  
*Visible emissions from mobile sources*

20. *The haul road shall not exceed two miles and the vehicle speed along the haul road shall not exceed 10 miles per hour.*

*The vehicle's speed limit on haul roads shall be posted at the beginning of the haul road. The posted speed limit shall large enough to be readable by the drivers.*

*The disturbed area shall not exceed 100 acres. Control of disturbed or stripped areas shall be required at all times for the duration of the project/operation per R307-205.*

21. *Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:*

*All crushers  
All screens  
All conveyor transfer points and drop points  
All product piles*

**Staker & Parsons Companies – Beck Street South Plant**

**Approval Order DAQE-307-02**

**Roads and Fugitive Dust**

21. *All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. The application of water or chemical treatment shall be used. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition. The opacity shall not exceed 20% during all times the areas are in use or unless it is below freezing. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*

- A. Date and time of day treatments were made*
- B. Number of treatments made, dilution ratio, and quantity*
- C. Rainfall received, if any, and approximate amount*
- D. Time of day treatments were made*
- E. Records of temperature if the temperature is below freezing*

*Records of treatment shall be made available to the Executive Secretary or Executive Secretary's representative upon request and the records shall include the two-year period prior to the date of the request.*

22. *Control of disturbed or stripped areas shall be required at all times for the duration of the project/operation per R307-205, UAC.*
23. *Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15 second intervals over a six minute period, however, shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary or the Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made ½ vehicle length or greater behind the vehicle and at approximately ½ the height of the vehicle or greater. The accumulated six readings shall be averaged for the compliance value.*

**C. E. Butters Realty & Construction**

**Approval Order DAQE-798-01**

**Roads and Fugitive Dust**

24. *All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. The application of water or chemical treatment shall be used. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition. The opacity shall not exceed 20% during all times the areas are in use or unless it is below freezing. The records shall include the following items:*
- A. *Date*
  - B. *Number of treatments made, dilution ratio, and quantity*
  - C. *Rainfall received, if any, and approximate amount*
  - D. *Time of day treatments were made*
25. *The haul road limitations shall be:*
- A. *0.6 miles in length*
  - B. *10 miles per hour*
- The vehicle speed on the haul road speed shall be posted, at a minimum, on site at the beginning of the haul road so that it is clearly visible from the haul road.*
26. *Control of disturbed or stripped areas is required at all times (24 hours per day every day) for the duration of the project/operation until the area is reclaimed. Records of treatment or and/or reclamation shall be kept for all periods when the plant is in operation.*
27. *Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15-second intervals over a six-minute period, however, shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary or the Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made ½ vehicle length or greater behind the vehicle and at approximately ½ the height of the vehicle or greater. The accumulated six readings shall be averaged for the compliance value.*
28. *Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:*
- A. *All crushers*
  - B. *All screens*
  - C. *All conveyor drop points*
29. *The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary.*

30. *Gordon C. Orton Construction Co., Inc shall abide by a fugitive dust control plan acceptable to the Executive Secretary for control of all dust sources associated with its operations. This plan shall contain sufficient controls to prevent an increase in PM<sub>10</sub> emissions above those estimated for this AO.*
31. *All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition unless it is below freezing. The opacity shall not exceed 20% during all times the areas are in use. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*
- A. *Date*
  - B. *Number of treatments made, dilution ratio, and quantity*
  - C. *Rainfall received, if any, and approximate amount*
  - D. *Time of day treatments were made*
  - E. *Records of temperature if the temperature is below freezing*
32. *The haul road shall not exceed 0.5 miles in length and the vehicle speed along the haul road shall not exceed 15 miles per hour.*
- The vehicle speed on the haul road shall be posted, at a minimum, on site at the beginning of the haul road so that it is clearly visible from the haul road.*
33. *Control of disturbed or stripped areas shall be required at all times for the duration of the project/operation per R307-205.*
34. *Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15 second intervals over a six minute period, however, shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary or the Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made ½ vehicle length or greater behind the vehicle and at approximately ½ the height of the vehicle or greater. The accumulated six readings shall be averaged for the compliance value.*
35. *Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:*
- A. *All crushers*
  - B. *All screens*
  - C. *All conveyor transfer points*

*The sprays shall operate whenever dry conditions warrant or as determined necessary by the Executive Secretary*

36. *The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary.*

**Jack B. Parsons Company – McGuire Pit**

**Approval Order DAQE-006-02**

**Roads and Fugitive Dust**

37. *Jack B. Parsons shall implement and/or operate in accordance with a dust control plan. All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. The application of water or chemical treatment shall be used. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition unless it is below freezing. The opacity shall not exceed 20% during all times the areas are in use. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*

- A. *Date*
- B. *Number of treatments made, dilution ratio, and quantity*
- C. *Rainfall received, if any, and approximate amount*
- D. *Time of day treatments were made*
- E. *Records of temperature if the temperature is below freezing*

38. *Visible emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations for traffic sources shall use procedures similar to Method 9. The requirement for observations to be made at 15-second intervals over a six-minute period shall not apply. Six points, distributed along the length of the haul road or in the operational area, shall be chosen by the Executive Secretary or Executive Secretary's representative. An opacity reading shall be made at each point when a vehicle passes the selected points. Opacity readings shall be made one half the vehicle length or greater behind the vehicle and at approximately one half the height of the vehicle or greater. The accumulated six readings shall be averaged for the compliance value.*

39. *Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:*

- A. *All crushers*
- B. *All screens*
- C. *All unenclosed conveyor transfer points \**

*\* - enclosed defined as having three (3) or more sides*

*The sprays shall operate when necessary, to ensure that the opacity limitations of this AO are not exceeded.*

40. *The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary.*
41. *The speed of mobile equipment (trucks, front end loaders, etc.) shall not exceed:*



- A. 15 miles per hour
- B. 0.4 miles in length

*The haul road speed shall be posted, at a minimum, on site at the beginning of the haul road so that it is clearly visible from the haul road.*

## **Jack B. Parsons Company – West Ogden Operations**

### **Approval Order DAQE-190-01**

#### **Roads and Fugitive Dust**

- 42. *Jack B. Parsons Company's, West Haven Asphalt Plant shall abide by a fugitive dust control plan acceptable to the Executive Secretary for control of all dust sources. This plan shall contain sufficient controls to prevent an increase in PM<sub>10</sub> emissions above those modeled for this AO.*
- 43. *All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. The application of water or chemical treatment shall be used. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition or unless it is below freezing. The opacity shall not exceed 20% during all times the areas are in use. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water and/or chemical treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:*
  - A. *Date*
  - B. *Number of treatments made, dilution ratio, and quantity*
  - C. *Rainfall received, if any, and approximate amount*
  - D. *Time of day treatments were made*
  - E. *Records of temperature if the temperature is below freezing*

*Records of treatment shall be made available to the Executive Secretary or Executive Secretary's representative upon request and the records shall include the two-year period prior to the date of the request.*

- 44. *The haul road limitations shall be:*

- A. 0.6 miles in length
- B. 15 miles per hour

*The haul road speed shall be posted, at a minimum, on site at the beginning of the haul road so that it is clearly visible from the haul road.*

- 45. *Control of disturbed or stripped areas shall be required at all times for the duration of the project/operation per R307-205, UAC.*
- 46. *Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity.*
- 47. *The Jack B. Parsons, West Haven Asphalt Plant haul road shall be paved and shall be periodically swept or sprayed clean as dry conditions warrant or as*

*determined necessary by the Executive Secretary. Records of cleaning paved roads shall be made available to the Executive Secretary or the Executive Secretary's representative upon request. The records shall include the two-year period prior to the date of the request.*

48. *Water sprays or chemical dust suppression sprays shall be installed at the following points to control fugitive emissions:*

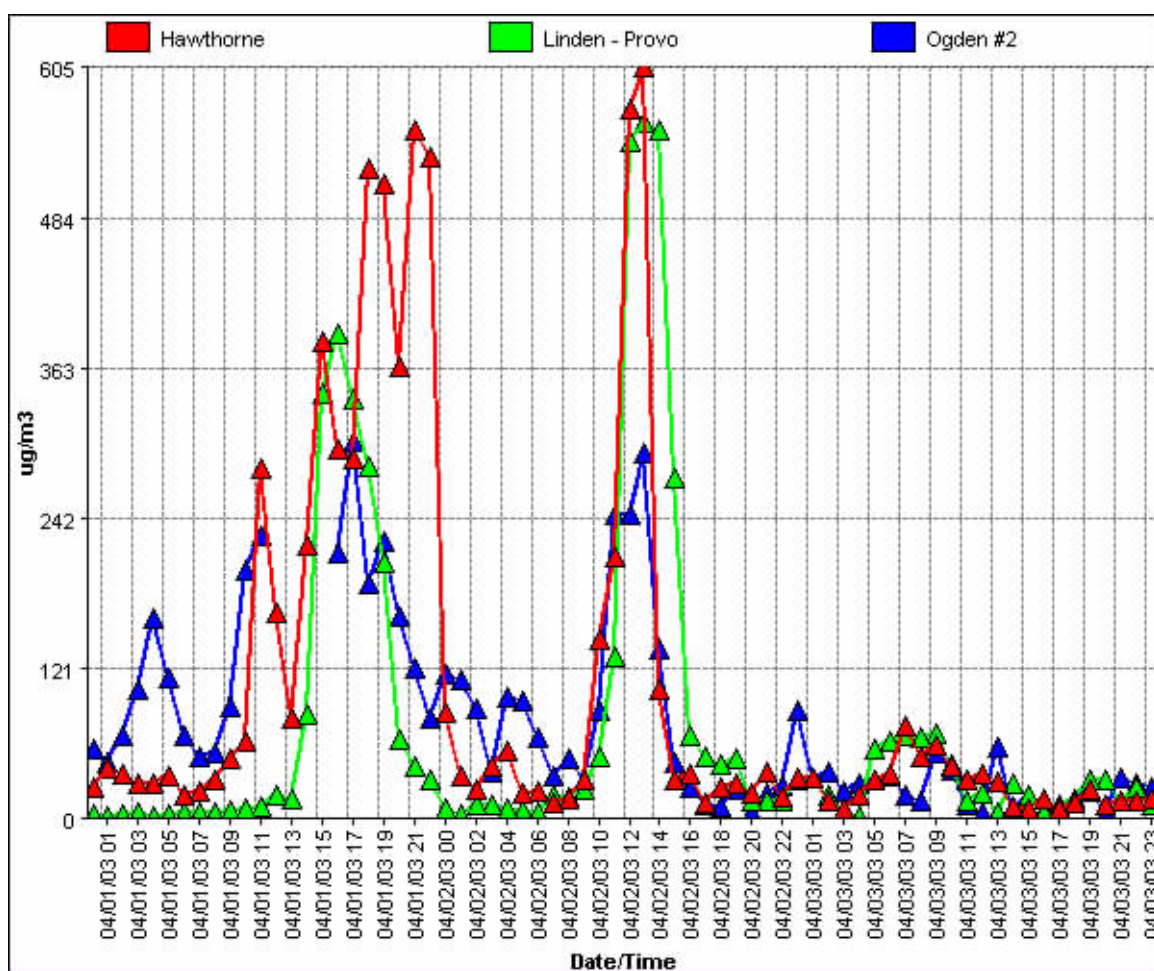
- A. *All crushers*
- B. *All screens*
- C. *All conveyor transfer points*

*The sprays shall operate whenever dry conditions warrant or as determined necessary by the Executive Secretary.*

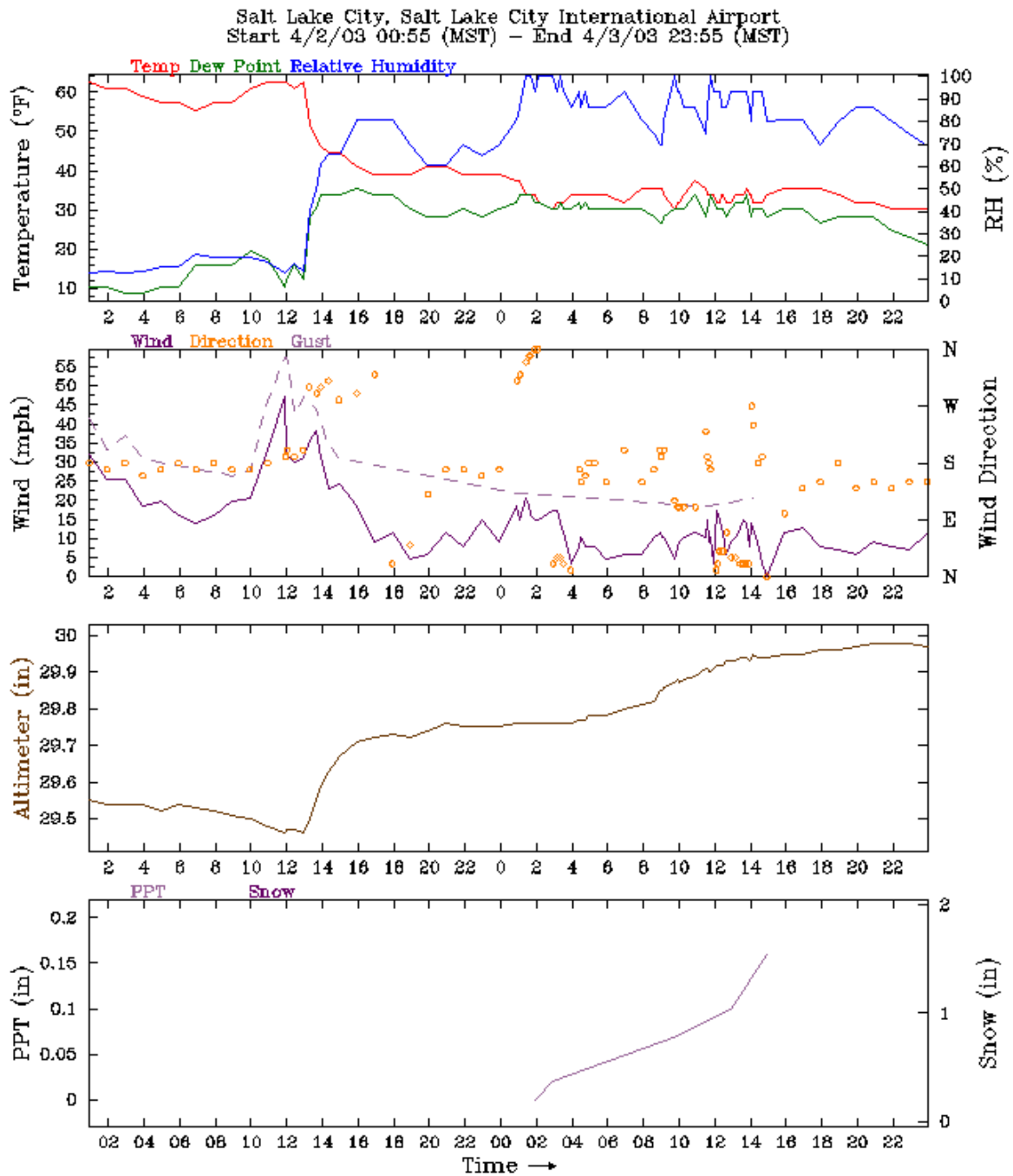
49. *The storage piles shall be watered to minimize generation of fugitive dusts, as dry conditions warrant or as determined necessary by the Executive Secretary.*

## Appendix II.

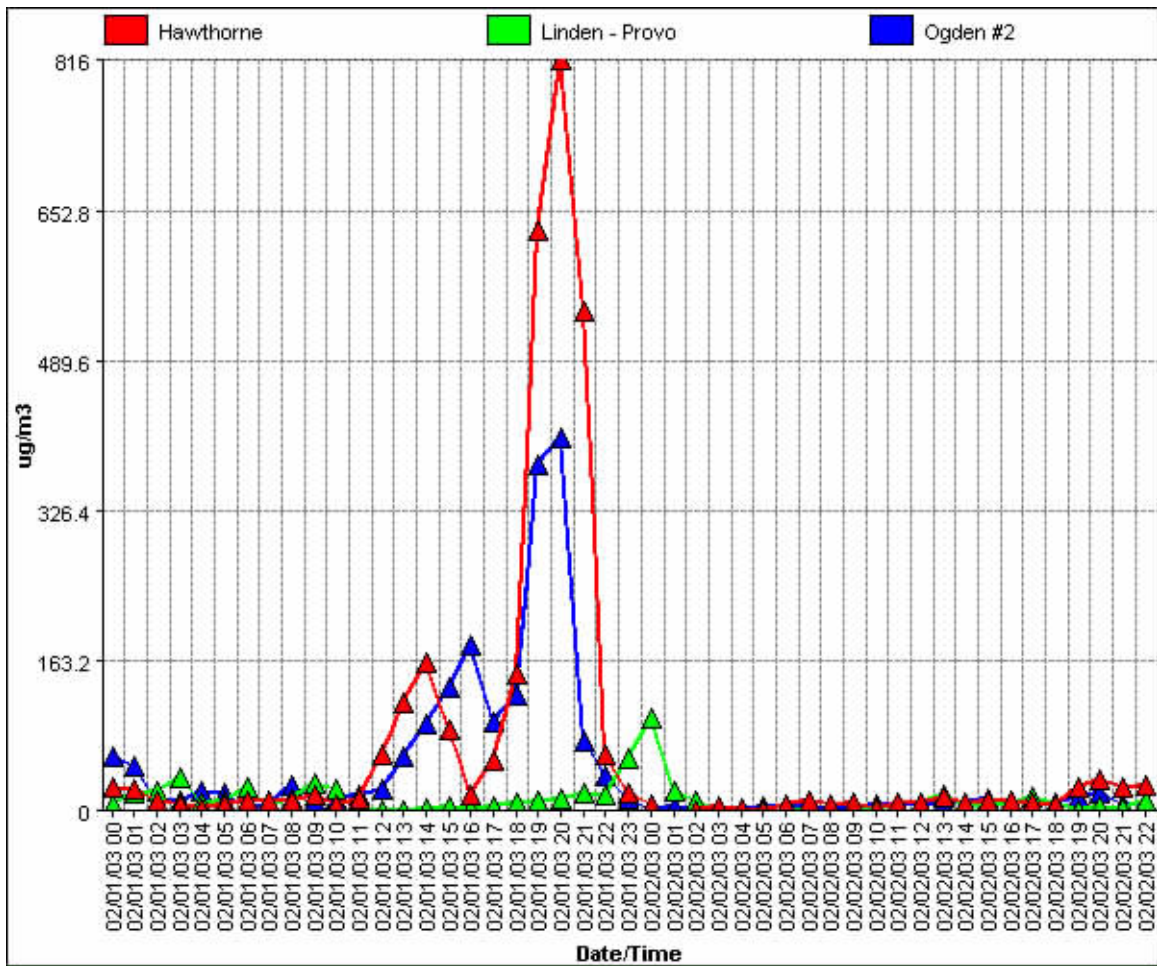
### Additional Meteorological Information



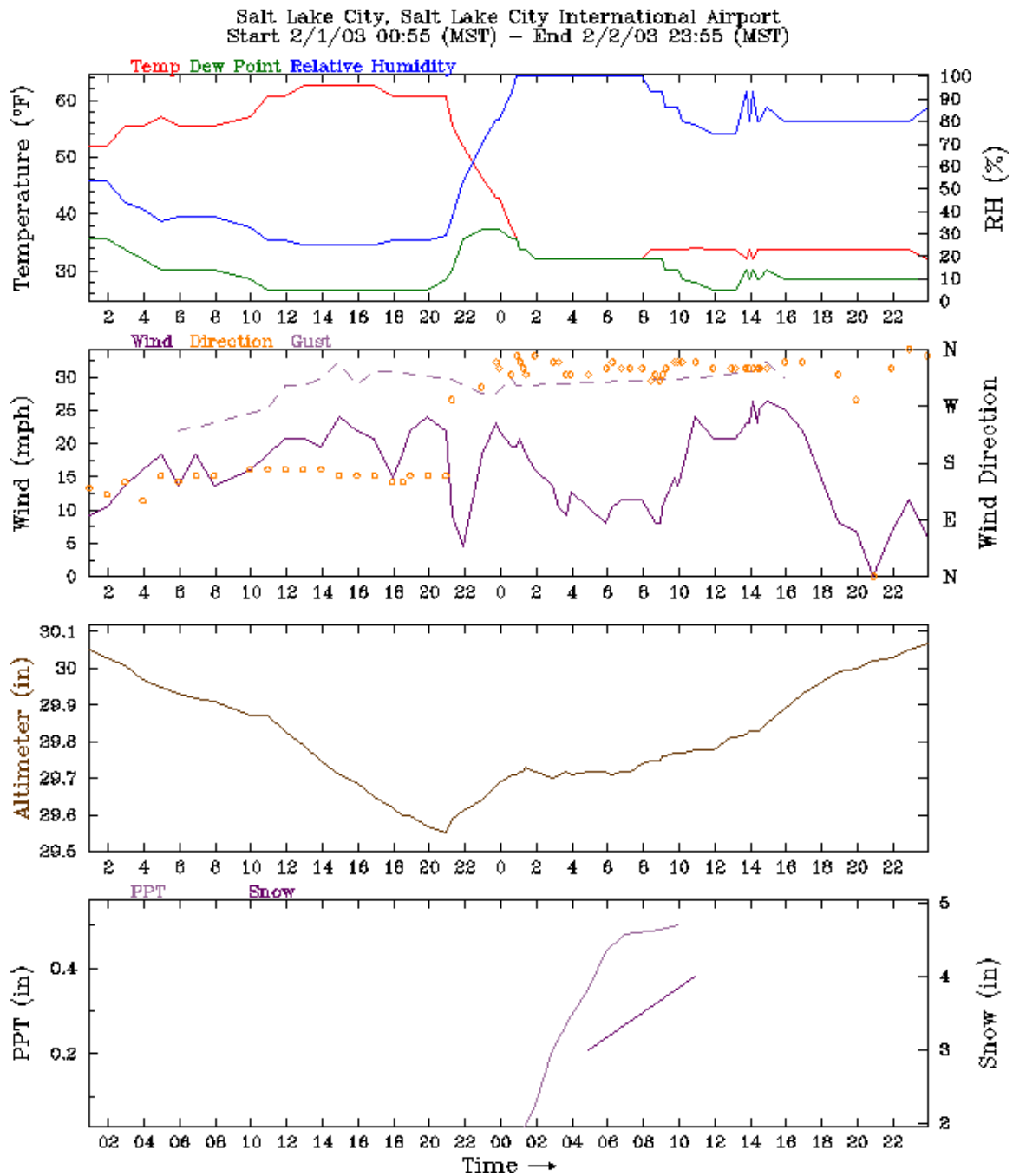
TEOM data from Hawthorne, Linden, and Ogden PM10 monitors from April 1, 2003 through April 3, 2003



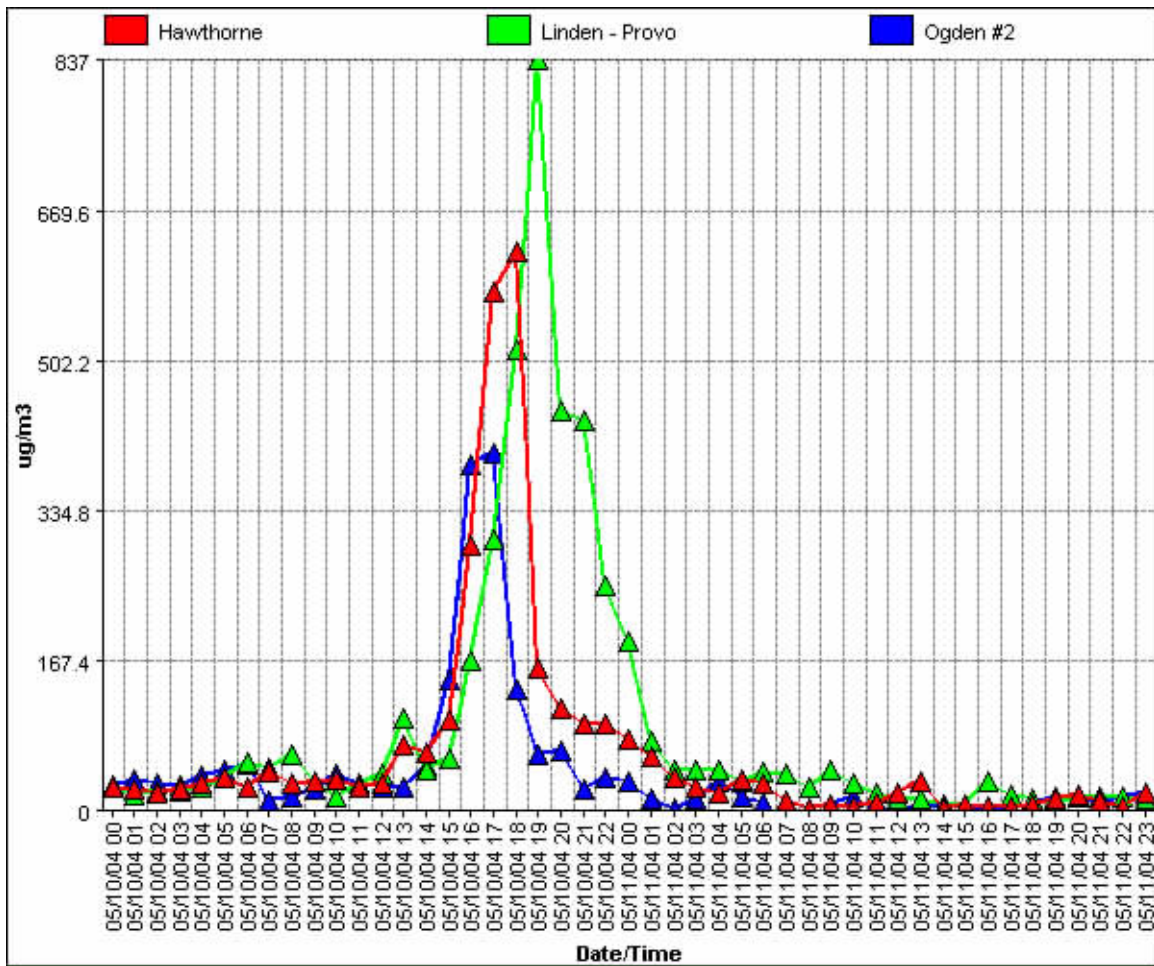
Atmospheric variables including temperature, wind speed, and direction from the Salt Lake City Airport from April 1, 2003 through April 3, 2003



TEOM data from Hawthorne, Lindon, and Ogden PM10 monitors from February 1, 2003 through April 2, 2003

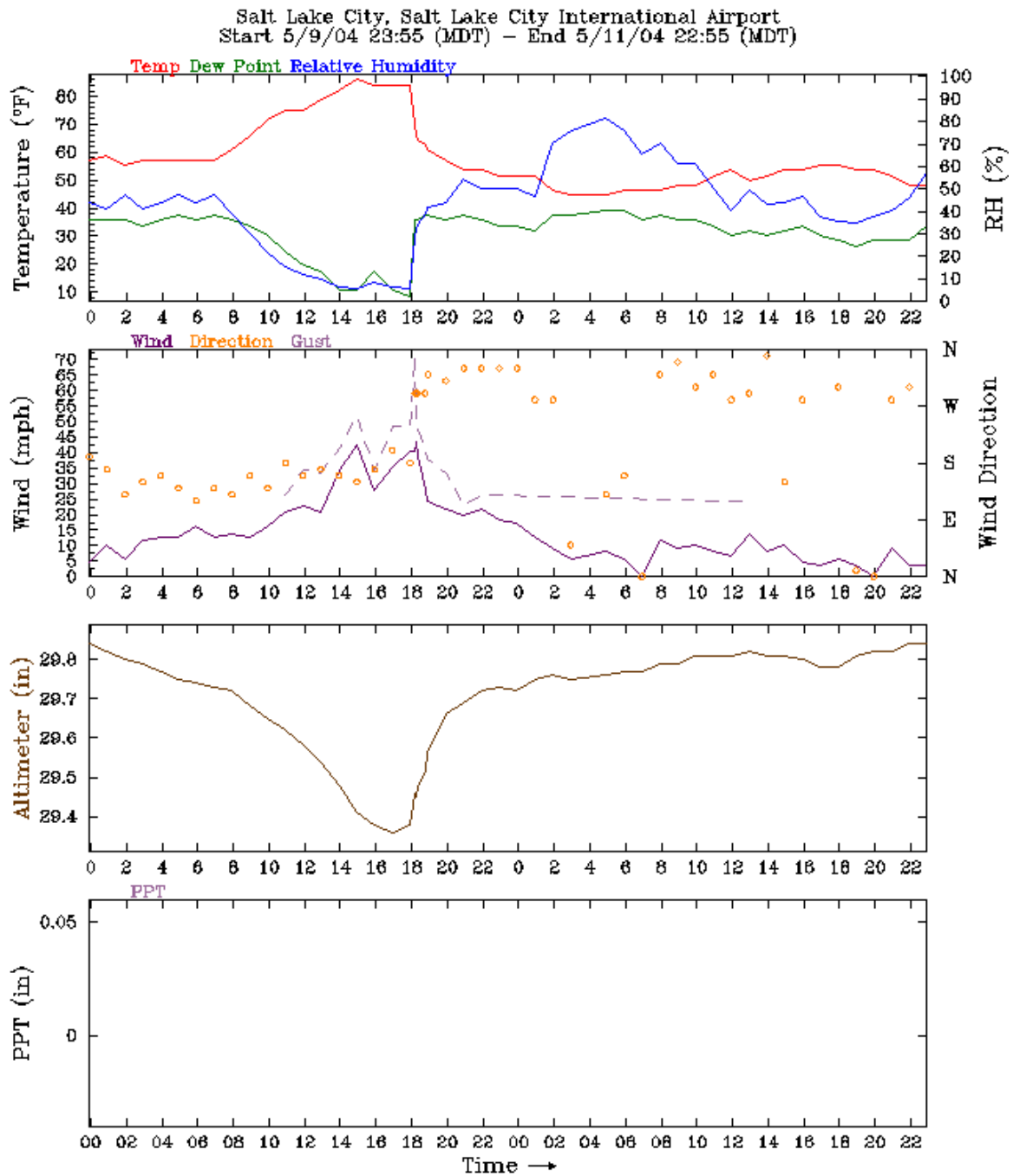


Atmospheric variables including temperature, wind speed, and direction from the Salt Lake City Airport from February 1, 2003 through February 2, 2003

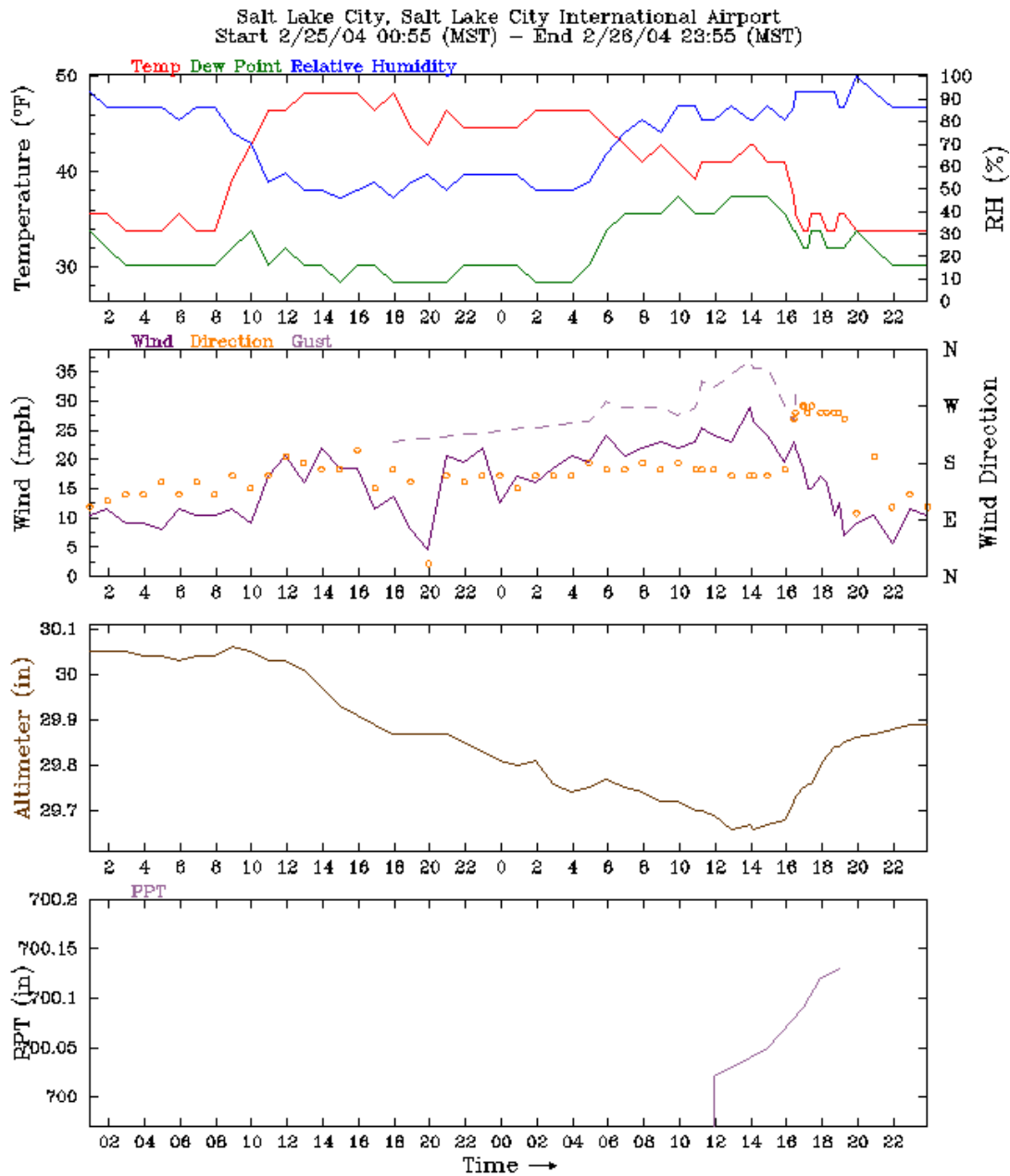


TEOM data from Hawthorne, Lindon, and Ogden PM10 monitors from May 10, 2003 through May 11, 2003

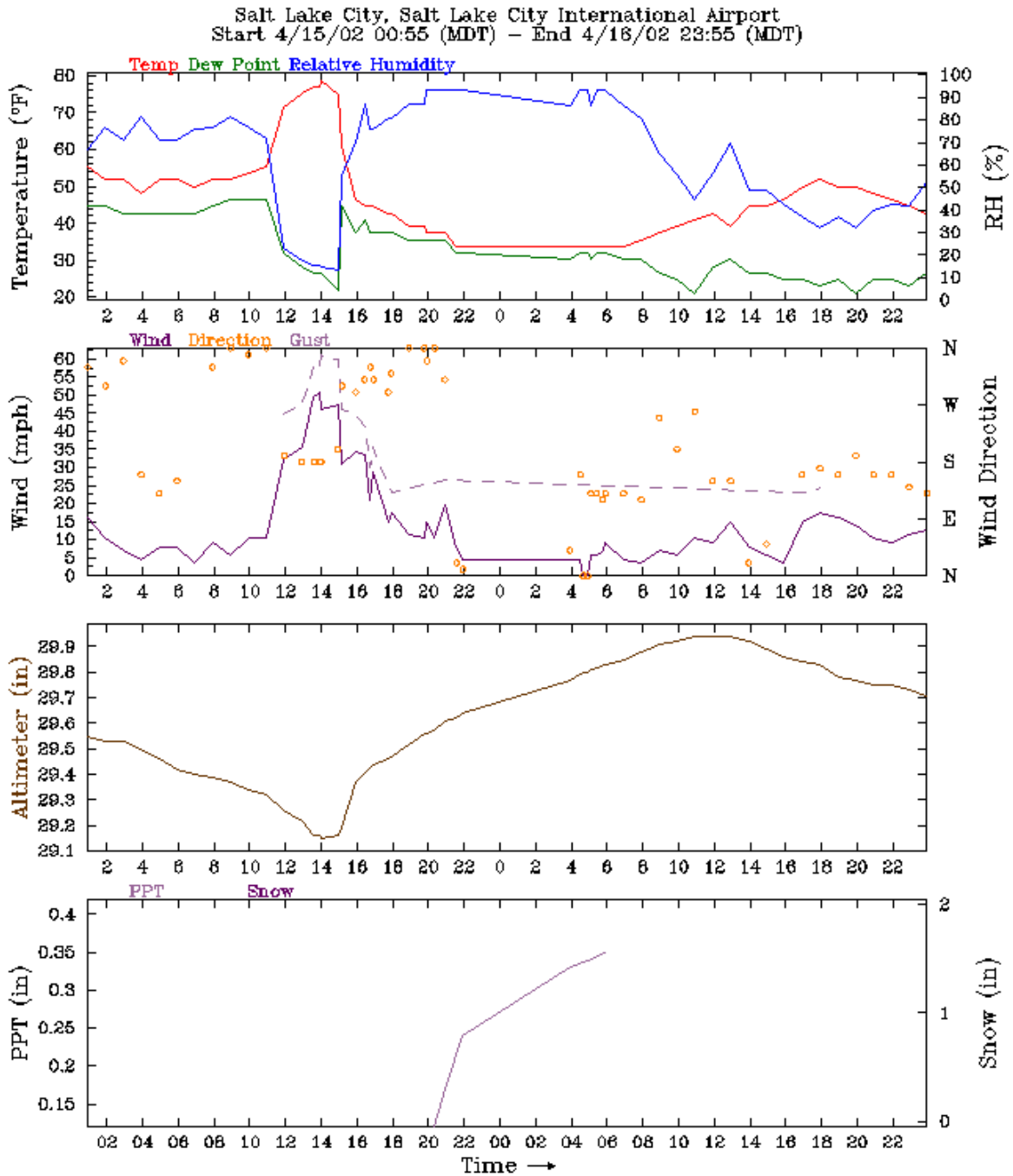




Atmospheric variables including temperature, wind speed, and direction from the Salt Lake City Airport from May 10, 2003 through February 11, 2003



Atmospheric variables including temperature, wind speed, and direction from the Salt Lake City Airport from February 25, 2002 through February 26, 2002



Atmospheric variables including temperature, wind speed, and direction from the Salt Lake City Airport from April 15, 2003 through April 16, 2003

Additional meteorological and air quality can be found for the event days on the attached Data CD's